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USSR Report

TRANSPORTATION

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CIVIL AVIATION

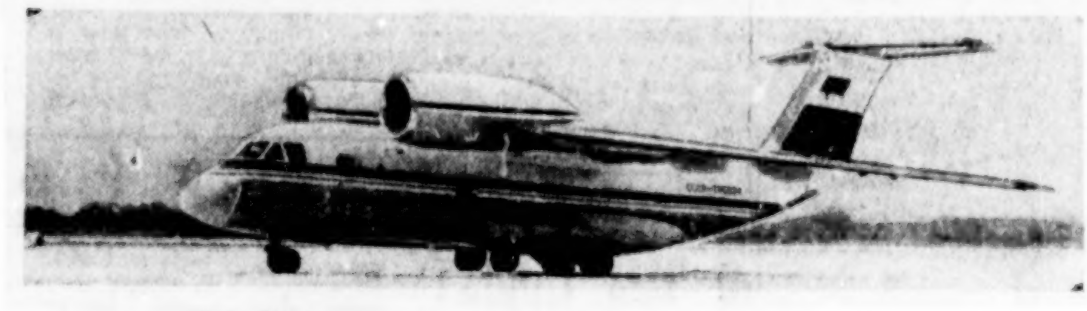
DESIGNER O. K. ANTONOV ON NEW AN-74 ARCTIC TRANSPORT

Kiev PRAVDA UKRAINY in Russian 22 Mar 84 p 4

[Interview with the chief designer O. K. Antonov by engineer T. Kuznetsova: "Aircraft for the Arctic" concerning the new "AN-74" aircraft; place and date not given]

[Text] An addition is coming into the family of the famous "ANs". A new aircraft developed by the KB [Design Bureau] of designer O. K. Antonov has been designated "AN-74".

The aircraft, of unusual configuration with the engines mounted above the wings, took off easily and climbed upward along a steep trajectory. Before going onto the severe Arctic routes for which it is intended, the aircraft must reveal all of its potentials, of its reserves in structures and assemblies, and undergo a number of changes and improvements. While the craft took the stiff examination in the sky we asked designer O. K. Antonov to tell us about it right at the air field.



The "AN-74" preparing for take-off.

The time has passed when the Arctic and Antarctic were considered inaccessible. People arrived there and converted the Arctic into a large industrial center and created a scientific research station on the sixth continent. All this was with the aid of aviation which, for the time being, is the one method of maintaining reliable regular communications with distant, little explored regions.

[Question] "Oleg Konstantinovich: It is not for the first time that your organization has worked on aircraft for the North. What does your accumulated experience say about this?"

[Answer] "The "AN-2", the first aircraft from our organization, has toiled in polar aviation for four decades in a row. Another airliner, the "AN-12", together with the "IL-18",broke the first air pathway to the Antarctic. We have long thought about developing a special modern aircraft for the polar explorers. The "AN-2" and "IL-14",which are flying over the icy regions right now,have earned a worthy replacement."

[Question] "The "AN-74" will become their successor?"

[Answer] "Yes. It is faced with continuing the glorious career of the winged assistants to the northerners. This aircraft was developed on the basis of the "AN-72", the first jet powered aircraft from our design bureau, which was for hauling freight to short or medium distances. It also has short take-off and landing runs. In the North,where it will have to fly, there are still small airfields. This determined the selection for the "AN-74" of two powerful turbo-fan engines and also the placing of them above the wing almost 4 meters from the ground. In this position the powerful flow of exhaust gases creates a supplementary lift force. In addition, it excludes foreign matter from the air intakes, and lowers the noise level in the cabin and on the ground. A powerful mechanization of the wing, a high power-to-weight ratio for the aircraft, and a low landing approach speed also contribute to the short take-off and landing. Good aerodynamic qualities, a large fuel supply, and a broad range of cruising speeds permit it to fly at various altitudes to significant distances from an airfield."

[Question] "Many of these qualities are also inherent in the "AN-72". How does the northern modification differ?"

[Answer] "On the exterior in the contrasting color (for better detectability in snowy places) and in the blisters, the transparent windows for the field of view of the navigator and the hydrologist. In addition to special operations for the organizations of drifting scientific stations in the Central Arctic region and carrying freight to provide for the stations within the Antarctic continent, the "AN-74" will carry out ice reconnaisance and guidance for ships. The aircraft is fitted with the very latest piloting, navigation, and radio communication equipment which permit flying under any physical and geographic conditions at any time of year or day.

With one and a half tons of cargo aboard, the "AN-74" flies to a distance of 4,500 kilometers at a 550 Km/hr speed. And this is not the limit of its capabilities. If necessary, the passenger seats are removed and a cargo with a total weight of 7.5 tons is accommodated. Loading and unloading operations are carried out by an on-board device. The craft is fitted with special dumping gear with which cargoes can be dropped onto an area from low altitude."

[Question] "Oleg Konstantinovich: How was the matter of the landing gear solved? After all, wheels are not for snow and ice."

[Answer] "With wheeled landing gear "AN-74" will operate on the ground and on snowy areas with a 15 cm depth of snow. In other cases, skis are necessary. This will be the first attempt in world practice to use skis on a jet aircraft. There are still many problems: the selection of the design parameters of the skis, the material for coating the runners, and the braking devices. One of the main problems is equipping the skis with an effective warming system. It is very important to take into account the Arctic and Antarctic conditions where an aircraft can freeze to the field in a matter of minutes."

[Question] "And how did you look after the pilots?"

[Answer] "Flights on Northern routes require from the pilots great skill, presence of mind, and, occasionally, real courage. We, the designers, have tried to create for them the maximum in comfortable conditions. The pilots' cabin is spacious with an enlarged field of view. The piloting of the ship has been made easier. All instruments and displays not directly connected with aerial navigation have been taken out of the field of view of the pilots. An automatic system of monitoring and signaling informs the crew about the condition of the aircraft and all of its vitally important subassemblies and units. Right now, the "AN-74" is going through plant trials. the pilots are giving the craft a high evaluation."

"Thank you for the discussion. We wish for your new 'children' a long and glorious wotking career."

9136
CSO: 1829/227

CIVIL AVIATION

IL'YUSHIN BUREAU DESIGNER ON FUEL CONSERVATION RESEARCH

Moscow VOZDUSHNYY TRANSPORT in Russian 5 Apr 84 p 2

[Article by G. Novozhilov, general designer at the OKB [special design bureau] imeni S.B. Il'yushin, corresponding member of the USSR Academy of Sciences: "The Effect of the New Integrated Technologies"]

[Text] Civil aviation, together with other branches of the people's economy, must play an important role in the solution of the tasks to economize the fuel-energy resources of the country which were decreed by the 26th Congress of the CPSU and the following plenums of the CPSU Central Committee. In the MGA [Moscow Civil Aviation Administration], a system of measures for decreasing the specific fuel expenditure by the rational usage of aviation technology and decrease in heat losses, has been developed and implemented. The thing of it is that more than half of all operational expenditures of Aeroflot associated with the transportation of passengers and cargo and aviation utilization in industry and agriculture go toward the aviation fuel.

Participating in the solution of this problem were specialists of the Central Administration of the International Air Services of Aeroflot and the flight service of MGA together with the scientists of the Academy for Civil Aviation and the Scientific-Experimental Center of Automation of the Air Traffic Administration who considered all stages of the flight performance and the planes' ground service from the position of fuel-energy resource economization, and developed a complete set of new technologies for flight performance.

The precise calculation of the most economical flight profile and the selection of the optimal echelons with the consideration of the most profitable navigation conditions, selection of the rational take-off and landing course, the optimal plans for plane steering at the airport, utilization of straight plane routes, decreasing the time for plane engines idling on the ground and decreasing the number of control-testing flights--this is, a far from complete list of the tasks that have been successfully solved by the developers of the work. Part of the task is formulated in the corresponding economic-mathematical models and is solved in the real time scale with the utilization of a computer, and another is realized by the introduction of individual technical economic means of the planes' ground service.

"Development and Introduction of the Set of New Resource-Saving Technologies of the Flight Performance on Aeroflot International Routes" is the full title of the work presented by the Ministry of Civil Aviation for the prize competition of the USSR Council of Ministers for 1984. Among its authors are the workers of the Central Administration of International Air Services of Aeroflot: N. Poluyanchik, general director; V. Rusol, senior navigator of the International Airport Sheremet yevo; V. Brusilovskiy, the head of the technical department; N. Samsonov, commander of the vessel IL-86, and others. The leader of this creative collective was B. Panyukov, the first deputy minister of civil aviation.

An important fact is that a large part of the new technological integration introduced on the branch scale and in full volume on Aeroflot international air routes, results in an annual relative savings of more than 60,000 tons of aviation fuel.

This work was recently discussed at the 2nd All-Union Scientific-Practical Conference for Air Traffic Management that was carried out by the USSR Academy of Sciences, Ministry of the Civil Aviation and the Moscow City Council of Scientific-Technical Societies. The participants of the conference approved of the work and supported its nomination for the prize competition of the USSR Council of Ministers.

And, one last thing that we would like to note. This experience, undoubtedly, presents a great practical interest for all branches of the people's economy of the country. It is a substantial contribution of the civil aviation workers to the realization of the state program of fuel-energy and material resources economization.

12404
CSO: 1829/254

CIVIL AVIATION

CHEMICALLY CONTAMINATED PLANES CAUSE CONCERN AT REPAIR PLANTS

Moscow VOZDUSHNYY TRANSPORT in Russian 3 Apr 84 p 2

[Article by V. Shkoda, the head of the chemical-toxicological laboratory of the sanitation-epidemiological station of Kazakhstan Civil Aviation Administration, and A. Samoshkin, sanitation doctor: "How to Repair the 'Poisonous' Technology?"]

[Text] The agricultural aviation planes that arrive for repairs to the civil aviation plants must be thoroughly degassed. Unfortunately, as practice shows, very often the planes that arrive at civil aviation [GA] plants No 405 and 406 from the Uzbek and Volga region administration are contaminated with poisonous chemicals. For instance, such are AN-2 No 02776, 54798, 68026 and 03532. Together with this, in the form there is a note concerning the implemented degassification.

A nervous atmosphere is created: the receiving clerk cannot accept such a plane for repair and the engine resources do not allow them to make the trip back; this work cannot be done on the spot, since the plant does not have a degassing area. The leadership of the plant is forced to accept the "dirty" planes, so as not to disrupt the repair plan. As a result, the technical personnel of the plant are subjected to the action of the poisonous chemicals.

We have appealed to various offices numerous times regarding this question, however, no one has thus far dealt with this important link of the workers' health protection. All that is necessary is that every plane scheduled for repairs would be really worked over. It also would be good if the repair plants receiving the agricultural planes had their own degassification area. Only then would the workers' health not be threatened.

We are wondering what the leaders of the aviation enterprise of the Uzbek and Volga region administrations, and the Aviaremont association, have in mind for the workers' health protection.

12404
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CIVIL AVIATION

IL-86 BEGINS REGULAR MOSCOW-PRAGUE SERVICE

Moscow VOZDUSHNYY TRANSPORT in Russian 3 Apr 84 p 1

[Article: "Regular Route of IL-86"]

[Text] The laconic radiodialogue between the air traffic dispatchers in the capital Airport Ruzin and the crew of the Soviet airbus IL-86 that had, for the first time, fulfilled the flight on the Moscow-Prague route, was finished with the wishes of "soft landing" said both in Czech and in Russian. Within several seconds, the gigantic steel bird swiftly lowered onto the landing strip.

"The Prague airport had long before thoroughly prepared to meet the airbus," said Irzhi Noginek, the head of the Prague airport in his conversation with a TASS correspondent. The brigades which will serve the first Soviet wide-fuselage plane on the ground had completed a special education course. The airport services also had to master the new technology for loading and unloading luggage. On the airbus, these operations are performed a lot faster than on other types of planes.

The winged machine will allow them to substantially increase the volume and the intensity of passenger transportation between the two capitals. Within the last year alone, the air companies of both countries transported more than 200,000 passengers on this route. This year, the number will increase.

The beginning of regular flights of the airbus testifies, also, to a good technical level of the Prague airport which is capable of servicing most modern planes. The hospitable Prague is included on the map of foreign routes for the Soviet air giant.

12404
CSO: 1829/254

IL-76 SERVICE TO REMOTE AREAS OF MAGADAN OBLAST

Moscow VOZDUSHNYY TRANSPORT in Russian 10 Apr 84 p 1

[Article by A. Krest'yaninov and Yu. Starodubtsev, correspondents of newspaper MAGADANSKAYA PRAVDA: "A 'Path' for the Airliner"; Magadan--Markovo]

[Text] It really does happen: we are flying in a modern air vessel, over there, where only recently, man's only means of transportation was a deer or dog team. Our road goes to the ancient village of Markovo, lost among the boundless spaces of Chukotka, which was founded more than three hundred years ago by the Russian Cossacks-explorers.

However, this is not what makes our special flight remarkable. To be more exact, not only this. We carry 40 tons of cargo on board. This is more than 3-fold that which the well-known AN-12 can carry at one time. Only the giant IL-76 has the power to lift such weight into the air, on board which we are conducting our report.

The extraordinary and complex features of this flight are that we will land not on the customary and reliable reinforced concrete take-off-landing strip, but on the dirt one, covered with snow, that was specially prepared for this occasion by the Markovo air personnel.

Of course, those whose duty it is have weighed and calculated everything and have foreseen every detail. There must be no surprises. And still... Today, not for nothing, there is an imposing commission on board, and Mikhail Umanskiy, the leading specialist on planes of this type and the best pilot-inspector of the administration, sits in the left pilot seat--in the position of the air vessel commander.

The second hour of our flight is almost over. Underneath is the snow-white, hazy tundra. Above, a little to the right of our route, is the bright, blinding sun. There is not a cloud in the sky.

The navigator, Vladimir Alekseyev, has dedicated 30 years of his life to aviation. The Magadan sky has been familiar with his 'handwriting' for 23 years. Behind Vladimir is the Chkalov Higher Aviation School and his work on the AN-2, LI-2, AN-12 and helicopters. And today, he is an equal member of the crew on board this wonderful machine, the IL-76.

The radio operator, Viktor Maznitsa, maintains constant communication with the ground.

A score of smart instruments and mechanisms will facilitate the pilot's work in flight. However, the moments of landing are special. One can physically feel the tension that the commander now experiences.

Again, the tundra turned over and reared. And here, on course straight ahead is the narrow strip of the smoothed, shining snow--the Markovo VPP /take-off-landing strip/. It looks like a path trampled in the deep snow.

The ground is a 100 meters away, 80, 60, 45, 30... We see the people who came to meet us. They have red signs in their hands. We can even read the writing: "We congratulate the IL-76 crew with the opening of the new route!" The people wave their hands and hats. The plane almost touches ground. But, what is it? Slowly, as if against its will, the ground moves away, and the airfield disappears from view. Again, a sharp curve and a new turn, and then it becomes clear: the pilot was examining the unfamiliar strip, as if trying it out. And here is the landing. A push--and trembling hard, the machine runs along the strip.

Valeriy Yasinskiy, the head of the local airport, told us about how they, in Markovo, were getting ready for the arrival of the first "76":

"This process was not especially difficult: we have no small experience because receiving the AN-12 is also no joke. Nevertheless, we had to extend the runway half a kilometer and widen it about 20 meters. How do we do that? A thin layer of snow is rolled until it is as hard as concrete, and then they roll a new layer. And they do this five or six times. Simple, but the work is tedious and responsible."

What will the opening of the new route give the village and the sovkhoz "Markovkskiy"? We address this question to the chairman of the village soviet, Vitaliy Karpenko.

"The thing of it is," he says "that we can no longer bring, by river, modern construction technology such as excavators because our pier is not adjusted for it and we do not have cranes for unloading vessels. However, we build a great deal, and even more and more from year to year. This is why the new air route was really necessary. Also, now it will be easier to transport meat products from the sovkhoz. And then, you know, the morale factor, also, plays a significant role. Our village cannot be found on any map, however, we are also not behind the times; here we are receiving such beauties."

Having left the prefabricated houses, which are convenient movable housing, in Markovo, we are getting ready for the trip back. The operators place frozen deer carcasses in the cargo compartment and cover the cargo with a special net.

The long and intense working day is coming to an end. Night lowers onto the tundra. In the semi-darkness of the pilot's cockpit the instruments cozily sparkle with multi-colored lights. We are facing the last jump--home, to Magadan.

The turbines increase their powerful thunder. The run is faster and faster. We are up.

The lights swim below, and now there is the black bottomless sky around us with shiny beads of stars.

Yes, it was not an ordinary flight. The air giant's mastering of the new routes that connect large cities with distant Chukotka villages (after Markovo, the IL-76 was also received for the first time in the village of Omolon), has permitted them to solve many important problems of the people's economy, connected with the further integrated development of production capacities of the extreme northeast part of the country and to expediently transport many tons of cargo.

The assimilation of the new northern routes is continuing.

12404
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CIVIL AVIATION

LABOR SUPPLY PROBLEMS AT IRKUTSK CIVIL AVIATION PLANT

Moscow VOZDUSHNYY TRANSPORT in Russian 10 Apr 84 p 3

[Article by Yu. Kolesnikov and V. Solov'yev, special correspondents: "To Preserve the Line of Succession"; Irkutsk]

[Text] We talked with V. Konovalov, the chief of the personnel department at Civil Aviation [GA] plant No 403, about things not too pleasant. The conversation was about cadre turnover. Only within the last year, as many new people were hired as quit the plant. Together with this, the qualified people leave, and the rookies come mainly from among the secondary schools and the Irkutsk Aviation-Technical School graduates.

"The turn-over of cadres here is, unfortunately, large," Viktor Nikolayevich says. "It is sad, but true..."

And then, as if he caught himself, he started to enumerate the measures that they carry out at the plant to stabilize the workers.

"In every shop, the social bureaus of cadres are acting. All instances of quitting are thoroughly analyzed. I can present specific figures. Due to the absence of housing, 83 people quit, the salary did not suit 48, 64 people were unsatisfied with their professions (one should understand this as working conditions). There is a store on the plant grounds, where one can purchase the items of primary necessity, a green house for the purpose of growing early vegetables was equipped, and recently a new administration building was turned over for operation; although extremely slowly, we are working on our own subsidiary farm and the rest facility on the shore of the Irkutsk reservoir. Other social problems are also being solved. For example, in the workers' canteen, the prices were decreased 20 percent and in some areas the lunches are free altogether. A one-time benefit (up to 50 rubles) is paid for mastering a trade-related profession and mastering a technological operation. Benefits for those discharged into the Soviet Army reserve have been established".

And still, the cadre turn-over is too big. What is the problem?

According to statistics, mostly young people work at Civil Aviation plant No 403, and more than half of the workers have not reached the age of 30.

This category requires increased attention, since it is the young who determine the tomorrow of the collective, which faces more and more complex problems every year.

Let's enter the helicopter disassembly area of shop No 9. The average age of the workers here is 22-24. The sector is situated in a comparatively new building that was recently insulated, and the temperature is quite normal.

"However, they did not take care of the amenities," says the area foreman N. Michkayev. "There is no bathroom, no sinks, no showers, and we change right here. And our work is rather dirty. However, this does not reflect on the mood alone. The labor organization is poor. The plans increase, and we are not ready for them. We work practically without stopping. The tool supply is bad; side-cutters, and even simple pliers--all these are in short supply. Of course, this situation does not suit the people, and from this comes the high cadre turn-over. For instance, Vladimir Balandin, a good specialist, left to be a sanitation technician in ZhKO [Housing-Building Services] and Valeriy Shishkin left to be a village club head. On one hand, they did not want to leave, they liked their jobs, on the other..."

New workers, right off the street, join the shift with experienced, prepared workers. For them it is effortless to wreck an important component, to cut a screw with a chisel, when it is supposed to be unscrewed. You train young fellows, teach them the trade and they are already looking around...

Maybe foreman N. Michkayev exaggerates, and the problem is not as bad as it seems? Let's visit one more collective in shop No 7, where the assembly of the AN-24 planes takes place. A. Lukhnev, a metal-assembly worker, has worked at the plant for 32 years and he saw all the transformations in production and the establishment of the collective. No few bitter notes sounded in his words. The old working cadres retire, but they have no worthy replacements, and the percentage of cadre change is very large. The shop was built without consideration for local conditions, and sometimes even the technological temperature is not observed; there are many cases of cold-type diseases. The special clothing is not washed or mended.

"At the beginning of this year," V. Ostapchuk, the senior control foreman and chairman of the shop committee trade union, joins the conversation, "the remuneration was reexamined, and the tendency was toward a decrease."

"Is that because new technology and the means for automation or mechanization were introduced?", we wondered.

"No, we are working as we have worked. On such production, the main tool is the hands, and they have not thought of anything new. The remuneration being decreased reflects on the worker's earnings, which means that soon the new notices 'according to my own desire' will arrive..."

We wondered, what motivated the reasoning of the plant economists in this particular case? Can it be smooth indicators alone? But who will fulfill the indicators, say, tomorrow? Isn't the shop already short of manpower?

"Due to the assembler shortage, the control foremen often take the working places themselves. Imagine that at that very moment in his own area," V. Ostapchuk continues, "there are up to 15 operations fulfilled simultaneously. Practically, how can one watch everyone? From here come the losses in repair quality--there are no few rookies in the shop.

The political-educational work at the plant is also not on a high level. However, at such enterprises, the problems of qualification and discipline border on such notions as "quality" and "flight security." Things here leave much to be desired. Compared with 1982, the number of disciplinary violations increased. Of course, the rising numbers can also be explained by an intensified struggle with the violators. But on the other hand, where did they look before? Or did they overlook and cover up?

Whomever we talked to at the plant mentioned the housing problem as one of the primary causes for the cadre turn-over. And we, also, do not have the right to pass it by. One cannot say that the plant is deprived of the ministry's attention. They do not build that little housing. However, the balance is not in favor of the plant workers. Two years ago, their own building with 75 apartments was turned over for operation and last year 35 more were added; however, the aviation repair workers received, respectively 32 and 8 apartments.

Where are the rest? The thing of it is that the construction lots are allotted by the gorispolkom in the densely populated region of the private housing ownership. Due to the demolition, tens of outside families receive the plant apartments. And often, without any lawful reason, the order of registration in the old houses that are subject to demolition is, in fact, controled by no one. V. Konovalov, the head of the personnel department, gave a characteristic example from a conversation with one of the house owners. The latter said frankly: "You should be thankful that we are decent people and have taken only three apartments; others in our situation would not let five slip by."

It is well known at the plant that housing is being built with the means of the plant but not for the plant. For instance, now they are turning over a building of 45 apartments, and it is again not clear who will get those. We have heard from the workers and the engineers more than once: "It would have been better if they did not build at all; it is only teasing." Thus, the plant is losing the working hands it so badly needs.

We will present one more example to be convincing. It is not the first year that the question of their own housing cooperative is being posited in the collective agreements. There are plenty of those who would like to enter, however, the question is still there. However, the plant workers were offered a non-suitable lot on the other side of town, an hour ride from their place of work, and they did not concede. That is, not the plant workers, but the leaders, the former plant director. They did not, without arguing, proving and struggling... Meanwhile, the people are leaving the enterprise.

12404
CSO: 1829/256

TRUCK DRIVER PAY EXPERIMENT AIMED AT IMPROVED SECTOR PERFORMANCE

Moscow AVTOMOBIL'NYY TRANSPORT in Russian No 2, Feb 84 pp 55-57

[Article by S. Belen'kiy, Scientific Research Institute for Motor Vehicle Transport: "Pay for Truck Drivers"]

[Text] In 1983-1984 at several automobile transport enterprises in general use by the Russian Federation, the Belorussian SSR, and the Latvian SSR as well as at some non-transport ministries and departments that have their own transport, an experiment will be carried out on the perfection of a system of payment for truck drivers. The experiment should be carried out in agreement with the corresponding union central committee.

The basic tasks facing the ministries, departments, and motor vehicle transport enterprises are:

checking the effectiveness of the systems of pay devised for truck drivers and their influence on the drivers' personal interest in the rational use of rolling stock as well as in the preservation and timely delivery of freight;

the establishment of conditions for a more objective assessment and accounting of transport work;

the liquidation of registrations and a consequent decrease in the shipping costs of agriculture, and provisions for saving fuels and lubricants;

checking those individual elements of the economic mechanism of motor vehicle transport enterprises that are connected with the change in the system of pay for truck drivers.

A piecework system of compensation can be successfull adopted only in the presence of certain obligatory conditions. Labor must be measured in terms of qualitative indicators of output that reflect the volume of completed work precisely enough. The working conditions should secure the fulfillment of quotas at the given level of equipment, technology, and labor organization. Stimulation of quantity must not lower the quality of completed work. An analysis of piecework pay for truck drivers as applied revealed deviations from these conditions.

The labor of truck drivers is measured by time in motion, which is reflected in quotas for time and in rates for completed work (tons x kilometers), and by time for the completion of loading and unloading work, which is equivalent to the quantity of transported freight (tons). However, in practical terms the driver has no influence over the amount of time spent idle during loading and unloading. This quantity is, one might say, a technological and organizational interval in the work of the driver. In the shipment of industrial and agricultural freight, 56 percent of idle time consists in waiting for loading and unloading.

This idle time is, in many cases, objectively unavoidable or even economically explainable. It is, for example, in the case of the simultaneous arrival of a few vehicles from various loading points at one unloading point, in the inexpedience of maintaining a highly productive and expensive unloading mechanism for relatively small freight traffic, and so on. Such idle time is not standardized, and is considered to exceed quotas, and the driver is paid only 37.5 percent of the tariff rate.

It is far from always necessary to stimulate an increase in the volume of transport. The work of motor vehicle freight transport, under conditions of concentration, specialization, and cooperation on the party of industry, in the majority of cases should ensure a well defined rhythm of transport and guarantee the date and correct sequence of delivery.

Even more rarely does the normative technology and organization of the transport process coincide with the actual. Such a situation excludes the possibility of an increase in output against the quotas, and places in doubt the probability of their fulfillment.

And finally, the piecework form of compensation does not stimulate the quality of transport, and does not take into account the conditions for its completion.

One serious drawback to the piecework system of compensation for truck drivers now in use is that it does not fully take into consideration the intensity of the labor.

The driver whose work involves long normative idle times on loading and unloading (manual loading and unloading) receives a shift assignment to a smaller number of routes than the driver of the same kind of vehicle for the transport of freight with mechanized loading. As a result, with mechanzied loading the driver is in motion sometimes two and three times more than the driver whose vehicle is loaded manually. However, the completion of a shift assignment guarantees the drivers identical earnings within the limits of the tariff rate. In practice, this leads to the job with mechanized loading and unloading becoming unprofitable.

Besides this, the large number of rates (up to 1,500), which take into consideration the freight capacity of the vehicle, the roads, the class of freight, the capacity of the freight lifting mechanism, etc, make the

system of labor compensation difficult for the driver to understand, create difficulties in the determination of earnings, and practically exclude control over the assessor's work. The driver is frequently of the opinion that his relationships with the dispatchers and assessors have a great influence on his earnings. It actually makes sense for a dispatcher to order an excavator with a bucket capacity not of one cubic meter, but 0.25 cubic meter (the motor vehicle transport customer does not order or pay for the capacity of the loading mechanism), and the rate is several times higher.

Deviation from the conditions obligatory for the effective application of piecework compensation makes the system inconsistently profitable, and creates a personal interest on the part of truck drivers in the registration of uncompleted shipments and work hours. Cases are known in which the vehicle transport customer credits the driver with uncompleted routes, as it is expedient for him to cover up his own significant (although sometimes unavoidable) idle periods, which involve fines and personal responsibility.

The transfer of piecework drivers to compensation on a time or time-bonus scale in its existing form is encumbered by certain circumstances.

The chief of these should be considered the fact that the presence of additional payments, strictly fixed in terms of nomenclature, and on the limitations of their maximum size by a permanent level of tariff rates created and increases a gap between the earnings of piecework drivers and hourly drivers. Thus in 1982 the gap in the average earnings of the drivers reached 70 rubles per month.

The adoption of the piecework and time systems in the existing form leads to a reduction in their stimulating fucntion, and establishes a personal interest in the artificial inflation of the payment indicators (tons, tons x kilometers, hours). The perfection of the system of compensation should proceed along the lines of a more precise assessment of the driver's labor contribution, and take into consideration the conditions and quality of completion of shipments.

A study of the practice of adopting forms and systems of compensation for labor in various branches of the national economy has shown that flexible, adaptive, and stable systems of payment, which take into consideration the intensity of the labor, the concrete conditions of its execution, and additional labor expenditures for overcoming conditions unfavorable to the course of labor processes, are being practiced on an ever larger scale. The necessary variety of additional payments, compensating for these additional labor expenditures, as well as the institution of allowances for the observance of corresponding rules, instructions, and so on, guarantees significantly greater effectiveness of the system. Because of the absence of the necessary additional payments, the motor vehicle transport enterprise workers virtually are obliged to give bonuses from the fund for the stimulation of the material interests of the drivers who work on obsolete models of transport vehicles, two-shift vehicles, and so on.

In certain branches it has become the rule to give hourly workers standardized shift assignments calculated on the basis of local norms. A differential scale of additional payments is widely used, depending on the completion of shift assignments by hourly workers.

Systems of labor compensation where the permanent (tariff) part of the earnings has a smaller proportion, where there are sufficiently varied payments as compensation for difficult and unprofitable conditions at the workplace and for intensity of labor, and where the range of bonuses is wide (the experience of the Volga Motor Vehicle Plant), are coming into wide use.

The experience of the foremost motor vehicle transport enterprises has shown the effectiveness of the material stimulation of such indicators as the safety of the vehicle, observation of traffic laws, and overseeing training. Bonuses of 20-40 percent of the tariff rate for the fulfillment of quotas, with regard for the period of use of the vehicle, instituted at Automobile Transport Enterprise-1 in Shevchenko, Mangyshlak Oblast provided, over one year, an increase of 14 percent in the production coefficient, and more competent use of and careful maintenance of equipment.

In recent years wages have increased, in general, at the expense of labor indicators, which in all branches of the national economy and especially in motor vehicle transport, have acquired an extraordinarily high significance. It has to do with intensity of labor, large psychological and physiological loads, the regime of work and rest, the presence of lengthy business trips, and unfavorable conditions for the completion of jobs.

The necessity of stabilizing the ranks of drivers requires a search for a method of compensation for the labor expenditures enumerated, among others, and each motor vehicle transport enterprise does this in its own way.

In this respect the experience of the Hungarian People's Republic in pay for truck drivers is interesting. Here in 1977 contracts for the compensation of truck drivers were put into effect that provide for supplementary payments for shift work, hazardous work, dirt roads, additional jobs associated with expediting freight, shipment of containers, and so on.

Taking into account tendencies in the development of systems of labor compensation established in the branches of the national economy, as well as the experience of socialist countries, it is possible to formulate two general requirements for a sytem of compensation for truck drivers: stability and fairness. A long-term system should be established, which provides compensation for basic and additional expenditures of labor, and likewise stimulates the qualitative indicators of transport security on the basis of the interaction of the parts and elements of wages. Equality of advantage in the system consists in the provision of equal compensation for labor, with satisfaction of the transport requirements of the object served (the customer), in equal conditions.

The mechanism of such a system of compensation is built on the interaction of the elements of wages, that is the tariff rate, allowances, overtime, and bonuses.

The basic driver's wage for a shift is based on the corresponding tariff rate.

The payment of allowances is stipulated for high individual professional qualities. In other words, this is an instrument essential to the directors of motor vehicle transport enterprises for the formation of a qualified and stable collective. Under the existing system only one allowance exists--for the driver's level of qualification.

Besides this, overtime has been introduced to compensate, on the completion of a shift assignment, for expeditent additional labor expenditures dependent on additional jobs not stipulated by the official obligations of the driver, unfavorable conditions for transport, and intensive use of means of transport. This is the supervision of a crew and the fulfillment of a loader's responsibilities, work on an "old" vehicle and as part of a two or three-shift crew, the transport of freight under the conditions of bad roads or high (low) temperatures, work on road trains, round trip transport of freight, when the vehicles is in motion for the greater part of the shift, and when idle time is minimal, that is, those things that are objectively necessary for a rise in the productivity of the labor of a driver and for the achievement of qualitative results in shipping. In the current system, overtime is stipulated only for the supervision of a crew (10-15 rubles) or for combined professions.

For the achievement of quotas in terms of quantitative and qualitative results of the transport provisions of the customer and for effective use of means of transport, the payment of bonuses is provided for. It should be noted that during the period in which the experiment was being conducted, the ministries and departments conducting the experiment in accordance with the corresponding union central committee were permitted to approve the conditions for bonuses and raise the size of the bonuses to truck drivers from the wage fund, to introduce allowances for work on vehicles with trailers and on truck tractors as well as other allowances and raises. The directors of motor vehicle transport enterprises conducting the experiment in agreement with the union committees can realize, within the limits set by the ministries (departments), the giving of bonuses to truck drivers from the salary fund in larger amounts for the fulfillment of quotas and other indicators characterizing the end results and quality of work. They can also establish indicators and the sizes of bonuses differentially within the limits of a maximum bonus size depending on the significance of the jobs completed by drivers and the peculiarities of the organization of shipments.

The so-called "shift-premium" system, developed at the Scientific Research Institute for Motor Vehicle Transport, might be one of the experimental systems for the compensation of truck drivers. The essence of this system consists in:

payment to the driver for working time in the course of a shift on the basis of an hourly tariff rate corresponding to the model and modifications of the vehicle, and to the planned (normative) length of the shift;

paying out allowances for level of qualification, the absence of traffic violations, uninterrupted service at a given enterprise, and overseeing of training;

bonuses for work on vehicles where the time elapsed before thorough repairs is more than that guaranteed by the manufacturing plant, on two-shift vehicles, under difficult road conditions, at unfavorable temperatures, on vehicles with two trailers, as well as for high-intensity of labor. Besides this, bonuses have been instituted for the completion of extra jobs (supervision of a crew, combined professions, and widening the zone of service);

the awarding of premiums for quantitative and qualitative indicators of the unit's transport service, and also for the effective use of means of transport. The indicators for premiums are fulfillment of the set shift assignment in terms of volume and time. A premium may be payed for the safe delivery of batches of freight, incidental loads of the vehicles, and for the maintenance of the vehicle in good repair. The indicators for premiums are determined by the management of the motor vehicle transport enterprise, based on the tasks set by the customer of the enterprise.

All payments are made from and within the limits of the wage fund. The nomenclature and actual sizes of the allowances and raises, within the limits of approved maximum sizes, are estabished by the managers of the motor vehicle transport enterprises and are reserved pending the development of regulations on labor compensation. It is possible to determine only a maximum size for allowances, bonuses, and premiums.

Approbation of the Scientific Research Institute for Motor Vehicle Transport system of labor compensation for drivers at the ministry's motor vehicle transport enterprises has shown that such a system, within the limits of the existing salary fund, makes labor compensation stable and fair. The criteria for assessing the effectiveness of the system's functioning are reduction in the expenditure of fuel, tires, and service life of the vehicles (expenses for transport of freight), with an increase in the level of the enterprises' transport service not accompanied by an increase in the salary fund.

The shift-premium system for compensating drivers may be recommended for experimental introduction. On the basis of this system, it is possible to decide questions connected with the choice of indicators for bonuses and the correlation of the interacting elements and parts of the wage, as well as to generate requirements for the perfection of tariffs and shipment planning indicators.

The shift-premium system for compensation for truck drivers is in experimental use at Moscow Oblast Motor Vehicle Transport's Shchelkovo and Ivanteyevka industrial units for motor vehicle freight transport, and at the No 4 Murom motor depot, belonging to the Vladimir Construction Transport trust. The results of the experimental introduction of the system will be taken into consideration with the development of standard regulations on compensation for labor in the motor vehicle transport field.

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DEPUTY CHIEF ON CAUSES OF ELECTRIFICATION WORK DELAYS

Moscow GUDOK in Russian 13 Mar 84 p 2

[Article by G. Kirsanov, deputy chief, Electrification and Power Resources MA, Ministry of Railways: "Who is Responsible for the Work Schedule?"]

[Text] The salient point about railroad electrification in 1983 was that the Ministries of Transport Construction and Railways decided to defer to the third quarter the deadlines for bringing many projects onstream. This allowed men and machinery to be concentrated at underway sites and the needed equipment to be delivered. Work was conducted and, what is particularly important, brought to completion before the onset of cold weather. As was to be expected, the result was higher productivity and better quality.

Previously the contact line men had been plagued for many years by the following misfortune: in the spring the support poles erected at the end of the preceding year would begin to "go", because the poles had been placed in pits that were then filled up with a mix of frozen soil and snow, often without the mandatory ramming. With the coming of warm weather everything would begin to float. Now, however, when the section comes onstream in September-October this unpleasantness is automatically avoided. And how much easier it is on the men! It is one thing to work up high in the summer or fall, and quite another when the temperature is 30-40°C and there is a strong wind. How can you expect high productivity and good quality in these conditions?

The advantages of completing construction in the third quarter or early in the fourth are irrefutable. This practice should be developed further.

The successful completion of underway projects last year owes very much to agreements on collaboration struck between builders and railwaymen. These called for advancing the target dates for installation work on readied sites and their phased commissioning. Also envisioned were mutual assistance and the creation of proper working conditions, specifically--the organization of temporary housing and of meals, the establishment of standing local staffs to control the way things are going and to oversee the construction process.

The initiators of these agreements were the Mininstry of Transport Construction's Main Administrations of Railway Construction in the North, West, in the Volga Region and the South on the one hand, and on the other--the Belorussian and Gorkiy Railroads.

But having noted the positive, we must not hush up the shortcomings. The foremost cause for concern is the situation which has arisen over recent years in the construction on the sections undergoing electrification of high voltage power lines and in the reconstruation of regional substations, both the responsibility of the Ministry of Power and Electrification.

It has, unfortunately, become a system: when construction and installation work on the electrified section is finished and it is time to begin electric train traffic, it turns out that the outside power supply is not ready. Last year, for instance, the Dolinskaya-Pomoshnaya section was completed in September, but power lines to Sugokleya were put up in November, to Osikovata--in December.

The Tyumen-Vagay section was readied in October, but electric trains began running only on December 22 because the high-voltage branch lines to the traction substations were installed only at the end of the year. On the Arkhara-Belogorsk section the reconstruction of two regional substations (by Zeyagesstroy Administration) and the installation of branch lines to two traction substations (by Dal'elektroset'stroy Construction Trust) have yet to be completed. Electricity is supplied to the section through a provisional hook-up which does not measure up to required reliability standards.

Many more such examples could be cited. Yet every year work schedules are drawn up. Endorsed by deputy ministers of power and electrification, these indicate the volume of work to be done and the deadlines for its completion. Assurances are tiven that everything will be ready by the time the electrified sections are commissioned. In reality, these projects are the last to be supplied with reinforced-concrete and metal construction parts. Work here usually begins at, so to speak, "curtain time". Nobody is held answerable for subverting the plan and the official work schedule.

Many outside electric supply projects are to be erected in 1984. In addition to new sites those left unfinished in 1983 must be completed. To get all this work done the Ministry of Power and Electrification must rethink its position on these projects. They must be rated among the ministry's most important assignments.

Another serious shortcoming is the persisting incomplete assimilation by general contractors of funds earmarked by capital investment plans for electrification. Thus, last year 11 million rubles were left over, although plan fulfillment on underway projects was 102.5 percent.

The crux of the matter is that year in, year out on construction start projects the deadlines for readying them for installation work are not met. Because of this, in the year when the electrified sections are to be commissioned there begins a "heroic" battle to overcome self-created difficulties.

It is common knowledge that if a certain volume of construction work is not done in the starting year, it is impossible, or at least very difficult, to commission the project on schedule. This notwithstanding, the main administrations and construction trusts of the Ministry of Transport Construction strive hard to keep their building-start workloads as low as possible in order to create a situation of temporary well-being for themselves. The project, though, is doomed to come onstream by way of a curtailed work scheme and subsequently to a long series of finishing jobs following the commissioning of the main facility.

But even these minimal plans are seldom implemented. Last year fulfillment of construction-start plans stood at 62.3 percent overall, for the Yanaul-Agryz-Chernyshevsk-Karymskaya-Cherusti-Sergach sections it was one third to one hald. The basic reason is that these sites are not provided with manpower, mechanisms are supplied in minimal numbers and are often defective to boot. Shipments of material resources are, as a rule, planned for the second half of the year, sometimes even its very end.

Who, then, needs such a system? Who ever dreamed up the notion that for about-to-be commissioned projects the plan must be well-balanced and buttressed by all the means at your disposal, but that the same does not apply to construction starts? Why must work on projects nearing completion begin at the start of the year, and on new projects just about any time, depending on the availability of human and technical resources from finished projects? Quite a few valid reasons could no doubt be cited, but I doubt whether any of them can justify the existing situation.

In our opinion, the right thing to do in the construction-start year would be to draw up a solid plan, back it with all the necessary resources and at the end of the year turn over all construction projects to installation crews. That way the main workload in the year or commissioning will be installation and tune-up jobs, and the construction subdivisions can be shifted to the next building starts. Other variants are possible too, but one thing is certain: the existing system must be changed, and the quicker the better.

One more problem to which, in my view, the Ministry of Transport Construction and the leadership of the various railroads must change their approach is the construction of housing for the sections under electrification. Everybody understands that there are no experienced local electrification cadres in the vicinity of the project. The railroad sectors involved organize completely new subdivisions to service the electrosystems installed. Without housing this task becomes virtually insoluble.

Nevertheless, the leadership of the railroads very often does not incorporate the construction of housing into their plan. The general-contractor trusts find a host of reasons, grasp at any straw to keep the building of this or that house out of their state plan. Of course, the builders sometimes do have objective reasons justifying their position, such as the absence of part of the engineering documentation or the belated drawing up by the client of his architectural layout specifications... All this is nothing new. Such shamful policies should be resolutely combatted.

In the meantime it often happens that electrified sections are commissioned and the newly-arrived operator personnel lives for long periods in railroad cars, in railroad station rest halls, in production premises temporarily converted to living quarters. Many give up on the housing promised to them and leave, with negative consequences for the operation of the commissioned section and the reliability of its work.

Of no help to the solution of the problem is the decision taken by the collegium of the Ministry of Transport Construction to terminate the erection of low-story two and four-apartment houses.

Construction trusts now refuse to include in their plan projects earlier developed by a general contractor and approved by the client. The documentation must be revised and new engineering specifications presented. This means that a new method of backing out from housing construction has entered the scene, because now the client is seemingly at fault--no documentation. The decision was adopted by the Ministry of Transport Construction unilaterally, without consulting the Ministry of Railways. Why?

Is such unilateral decision-making proper? I think not. Similar criticism can be leveled at the Ministry of Transport Construction for its never-ending replacement of the general contractor on one and the same project without consulting the Ministry of Railways. Because of these replacements the project documentation has to be reworked, earlier decisions revised, approval of bank credits for construction delayed--in short, the business at hand is pervaded by an atmosphere of nervous apprehension, uncertainty. At times the client railroad doesn't know who to deal with, what general contractor it should approach to coordinate efforts and iron out difficulties.

I have touched on but some of the problems. There are many, and all must be resolved quickly and correctly. This will help to successfully carry out the assignment for railroad electrification in the remaining years of the eleventh five-year plan and raise the target figure to two thousand kilometers a year in the twelfth five-year plan period.

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CHS7 ELECTRIC LOCOMOTIVES TESTED IN REVENUE SERVICE

Moscow GUDOK in Russian 15 Mar 84 p 1

[Article by GUDOK correspondent I. Kokoulin: "The ChS7 Carries Passengers"]

[Text] Moscow--Yesterday, March 14, at Moscow's Kievskaya Passenger Station a powerful ChS7 electric locomotive was coupled to fast train No 33 Moscow-Truskavets. The locomotive carried a streamer which read: "New locomotives from fraternal Czechoslovakia to haul long passenger trains!" The new locomotive compares favorably with any other of the ChS series--it is taller, longer and more powerful.

Much has been done here to improve working conditions for the crew. Two comfortable armchairs, a refrigerator, an electric range, air conditioning. The high ceiling permits even the tallest driver to stand erect without stooping the way he had to in the old locomotives. You can walk unimpeded along the wide passageways, not sidle. In the event of a breakdown a special diagnostic instrument shows the exact spot where the mishap occurred, the crew does not have to waste t me searching for it. In addition to the electropneumatic brake an electrodynamic one has been installed.

The depot of Moscow's Kievskaya Passenger Station received nine ChS7 locomotives from the Czechoslovak Skoda plant. The crews began to study the machines with enthusiasm, the repairmen--to ready a base for curing their ills. The filling station that stocks locomotives with sand was rebuilt. Next in line is the reconstruction of the depot itself.

Up to now the ChS7 locomotives test-hauled long trains without people aboard. The results were good. Today the first of these locomotives is setting out on its maiden voyage with a passenger train of as yet normal length. Later on the ChS7's will haul trains one and a half and twice the normal length.

After a brief meeting the director of the Skoda electric locomotive plant M. Shulak together with deputy chief of the Moscow Railroad P. Akulov formally presented engine driver Yu. Oberchuk, who 20 years ago drove the first ChS2 electric locomotive as an assistant engine driver, with a symbolic key. Comrade Oberchuk and his assistant V. Baranov then set out on their journey.

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CHANGES IN INDEPENDENT OPERATIONAL GROUPS OF SHIPS URGED

Moscow MORSKOY FLOT in Russian No 3, Mar 84 pp 12-15

[Article by Sea Captain V. Ponomarev: "Where Are the Independent Operational Groups of Ships Headed?"]

[Text] The modern processes of the management of social production are divided into two categories. The first of them includes the creation and improvement of control systems, with respect to the elaboration of the forms and methods of management. The processes of management proper, the organization and conducting of managerial activity and production itself are assigned to the second category. When only one link falls from the chain of these processes, irregularities of the management machine begin. To some extent this is happening with the independent operational groups of ships in some steamship companies.

The Task and Practice

The idea of organizing independent operational groups of ships within steamship companies had practical grounds. These groups were set up for the purpose of the comprehensive settlement of the questions of the increase of the efficiency of the use of the fleet, the increase of the initiative and responsibility of the specialists of the steamship company and the crews of ships for the results of production and financial activity, the assurance of trouble-free sailing and the introduction of the optimum methods of the management of ship traffic. It was anticipated that the independent operational groups of ships would become "microsteamship companies." Their formation took place in different ways, depending on the peculiarities of the operating conditions.

Many steamship companies, envisaging the increase of the role and responsibility of middle-level specialists, at the first stage included within the independent operational groups of ships operators, economists, planners, financiers, merchants, captain-instructors, mechanic-instructors and others. Here the management services and divisions retained their basic functions, without changing the organizational forms.

At first the structure of the independent operational groups of ships in individual steamship companies seemed optimal both horizontally and vertically. Subsequently on a resolute basis these structures soared higher and wider. The multistage nature complicated the settlement of operational questions. The

steps, which the sailor sometimes has to take, became steeper: the group traffic supervisor, the senior traffic control engineer for the fleet, the chief of the independent operational group of ships; the deputy chief of the transportation service, the chief of the transportation service, the chief of the functional subdivisions, the chief of the administration, the deputy chief of the steamship company for operations, the chief of the steamship company. The management costs are in evidence.

All this could have happened only because the processes of management had not been studied and the methods of activity of the leading independent operational groups of ships had not been generalized. Although back in 1977 at a seminar in Leningrad the questions of the scientific studies of the operation of independent operational groups of ships had been put in one of the first places. The need for the study of specific management experience and the possibility of carrying it over from one steamship company to another were discussed.

Scientific studies, apart from everything else, also perform a control function. They prevent the making of a subjective decision. In this instance that was not the case. The development of independent operational groups of ships here and there assumed a spontaneous nature.

The Structure Is Secondary

Whereas the goals and tasks in case of the organization of independent operational groups of ships in steamship companies were known in general outline, the amount of work and the functions of individual specialists of the independent operational group of ships seemed vague. The blurriness of functions, relations, rights and duties is observed in many of them. In such a situation it is difficult to establish consistent regulation. And all this is because the rule: the structure is secondary, was not observed precisely.

It seems that the specific nature of one steamship company or another does not exclude but, on the contrary, firmly establishes the general principles of their general activity. Management itself and its functional and structural arrangement are called upon to accomplish the common tasks of the sector. First of all this pertains to the operational subdivisions, including the independent operational groups of ships. The experience of recent years shows that the trend of "originality" in some structures is progressing.

Thus, in the Baltic Steamship Company the subdivision, which unites all the independent operational groups of ships, is called the Administration of Fleet Operation (UEF), in the Latvian Steamship Company it is called the Transportation and Fleet Movement Service (SPiDF). The goals and tasks of the subdivisions are identical, but they are called by different names. The picture for other steamship companies is also the same. It would seem that there is nothing peculiar. But this is not the case. In the Baltic Steamship Company the chief of the Administration of Fleet Operation at the same time is the deputy chief of the steamship company. In the Latvian Steamship Company along with the chief of the Transportation and Fleet Movement Service there is a deputy chief of the steamship company for operations, that is, another level of management.

In the Baltic Steamship Company the chief of the Administration of Fleet Operation has three deputies: for general, commercial and financial affairs, for the line fleet and for the tramp fleet. In the Latvian Steamship Company the chief of the Transportation and Fleet Movement Service has four deputies: for operational planning, for the chartering of ships, for line and container transportation and for consignment operations.

The divisions of ports, operational planning and others, which do not exist in the structure of the Administration of Fleet Operation of the Baltic Steamship Company, have been established in the structure of the Transportation and Fleet Movement Service. Here they are connected with at least two more deputy chiefs of the steamship company. Scientific studies could say which structure is better and which is worse.

Here it is important to note: the differences in the cited structures are not due to the specific nature, the composition of the fleet or the operating conditions. Incidentally, in some steamship companies there are both services and administrations. It is difficult to explain this by production expedience, rather, the desire to stimulate the labor of a specific worker has an effect. In reality, the deputy chief of the service, who does not have subordinates, is like a coach without a team. Probably, it is easier to agree with those who consider it necessary in such cases to introduce in the lists of staff chief specialists for specific questions.

As a rule, experienced people manage the fleet. Some of them were outstanding navigation experts. They sense the overlaps in the structures. However, not everything depends on them. There are superior organs, there are staffs, limits and others. In a real situation to be able to pursue one's own policy frequently means to "make a hole." The structure of the independent operational group of ships frequently was also formed subject to the "penetrating" force of one manager or another.

The fleet of the Baltic Steamship Company numbers 175 ships, which are distributed among 6 independent operational groups of ships, while the 106 ships of the Latvian Steamship Company are distributed among 3 independent operational groups of ships.

Independent Operational Group of Ships No 3 of the Baltic Steamship Company includes 49 ships, mainly general-purpose ships which are used in tramping. The ships are divided up (16, 15 and 18 ships) among three group traffic supervisors. In the indepedent operational group of ships there is a group of specialists for commercial work, but it is engaged only in the initial processing of claim documents.

Independent Operational Group of Ships No 1 of the Latvian Steamship Company has 57 tankers and gas carriers, which are distributed among 4 group traffic supervisors. Here there is an analysis group made up of four specialists. It performs a large amount of commercial and financial work, but also not in full.

Captain-instructors and mechanic-instructors appear formally in the staff of the independent operational groups of ships of both steamship companies. In

practice they do not exist. In the Baltic Steamship Company there are captain-instructors in only two independent operational groups of ships, while there are no mechanic-instructors in any independent operational group of ships. The whole point is that the dividing up of the ships among the independent operational groups of ships is carried out according to some attributes, in the navigation safety service--according to others, in the ship mechanical service--according to still others. For example, the specialized groups of ships of several instructors are reckoned in three or four independent operational groups of ships. The noncoincidence of the groups depersonalizes the basic idea--the idea of comprehensiveness. Moreover, the instructors proved to be dually subordinate. It is possible to assume that the present status of the instructors affects their work and tells in the decrease of responsibility.

The conclusion arises that at present in some steamship companies the structure of the independent operational groups of ships is aimed mainly at the settlement of operational questions, in others--in part at commercial matters, in still others--at commercial and some financial matters.

On the Question of Cost Accounting

A unique album lies on the desk of the chief of the Administration of Fleet Operation, who is the deputy chief of the Baltic Steamship Company. In it there are more than 20 pages, on each of which there are several color diagrams. This is an analysis of the operation of the fleet. It is given with allowance made for the basic and additional indicators, by lines and directions, by classes of ships, by cargoes and by operating areas. Here the ships, cargoes and operating areas, which are of particular importance for the steamship company, are distinguished. The album contains the data for 10 years. It merits a separate detailed discussion. Now it is important to stress: in our times in the operational subdivisions of steamship companies they are attaching great importance to the analysis of the operation of the fleet. The functions of analysis have also made their way to the independent operational groups of ships.

However, the workers themselves of the independent operational groups of ships do not believe that their subdivisions are cost accounting subdivisions. They do not have economic independence, they do not have a separate balance sheet and everything that would enable them to carry out production activity on the basis of cost accounting. Finally, the legal status of the independent operational groups of ships as production units has not been set down legally. For this reason they do not have contractual or other functions. The independent operational group of ships cannot act as a subject of law.

In the Statute on Independent Operational Groups of Ships there is an indication of internal cost accounting. But what is this? In the encyclopedic dictionary it is said about internal cost accounting that this is a component of cost accounting. It is used in the shops, sections and functional divisions of socialist enterprises. What is a "component"? Its interpretation can be different. In some steamship companies they base themselves on the fact that the cost accounting enterprise can establish for its subdivisions such cost accounting conditions as it considers expedient.

Thus, the steamship company as an independent enterprise elaborates the corresponding assignments not only for the independent operational groups of ships, but also for all its subdivisions. In most instances attention is not directed here to whether or not the subdivisions are cost accounting subdivisions.

In practice the cost accounting conditions of the operation of the independent operational groups of ships are specified by the production plans. The indicators of these plans are the sum value of the plans of the ships. While the sum of the plans of the independent operational groups of ships is equal to the plan of the steamship company. The plans of the operation of the independent operational groups of ships of the Baltic Steamship Company for 1983 included three groups of indicators: basic, additional, estimated. This, so to speak, is the main plan of each independent operational group of ships, which is based on the system of planning by sailings. And all the work of the independent operational groups of ships, including their activity on the organization of the voyage on the basis of the NGRF [continuous schedule of fleet operations], is concentrated around this plan. The indicators on sailings are under constant control in the independent operational groups of ships and at other levels, close attention is devoted to them at traffic control conferences, their efficient recording and reporting in accordance with them have been set up. However, the voyage is the production cycle of the operation of the ship. The departure of the ship with a cargo from the port is the start of the cycle. Its end is recorded after unloading at the port of destination. Precisely after the unloading it is possible to speak about the financial results. Cost accounting begins with the finish of the cycle. Otherwise what is calculated? The "part" which has been placed into production? And what is its production cost, what is the quality?

The financial plan or the plan on completed voyages is also coming down to the independent operational groups of ships. The quarterly indicators on revenues, expenditures and receipts are established in it. Two groups of indicators and, hence, the corresponding number of specialists are employed in the system of the planning, accounting and tallying of the results in the independent operational groups of ships, the steamship company and the ministry. Is not all this superposed? Do necessity or habits accompany double planning?

On the basis of the plan indicators socialist competition was launched between the independent operational groups of ships in the steamship companies and on a sectorial scale. In the Latvian Steamship Company the results of the socialist competition of the independent operational groups of ships in accordance with the transportation and unloading of cargoes in foreign navigation, the transportation of cargoes in coasting navigation, the profit, the productivity of the operation of the fleet (unloading per ton-day), the indicator of the demurrages per 1,000 tons of transferred cargo (at Soviet ports) have been hung in the corridor, in which the transportation service is located. The data are entered in the column of each independent operational group of ships in accordance with these five indicators in a percentage ratio to the plan of the corresponding quarter of last year. The place held in the socialist competion is determined according to them.

In the other steamship companies the indicators of the socialist competition are slightly different. At times the indicators of the turnover of personnel,

the accident rate and so on are included in the conditions of the competition between the collectives of the independent operational groups of ships.

At the ministerial level the winners of the competition are given material incentives, while at the level of the steamship company this is not done everywhere. For example, in the Baltic Steamship Company there existed a somewhat unique practice of discussing the results: the chiefs of the independent operational groups of ships were not invited to the tallying of the results, while the distribution of the places played only a moral role, a material reward was not envisaged. And this is when formally the independent operational groups of ships nevertheless operate on a cost accounting basis. But such a system exists not only in the Baltic Steamship Company alone.

Today the decree of the CPSU Central Committee and the USSR Council of Ministers "On the Improvement of Planning, the Organization of the Transportation of National Economic Cargoes and Passengers and the Strengthening of the Influence of the Economic Mechanism on the Increase of the Efficiency of the Work of Enterprises and Organizations of Transportation" is the program of the economic activity of steamship companies and its subdivisions. Therefore the updating of the mechanism of independent operational groups of ships is on the agenda.

More on Criteria

Life has shown that in many steamship companies the independent operational groups of ships are used quite often as "information bureaus" or "bureaus of good services." For example, at the Baltic Steamship Company they go to the independent operational groups of ships with all needs, up to the duplication of materials and their dissemination on the ships. As if there are dispatch departments and duplicating equipment in the independent operational groups of ships. The captain phones the independent operational group of ships and informs it that the barmaid did not get by the medical commission, it is necessary to replace her. But what about the personnel division? "Why do I need the personnel division, when there is the independent operational group of ships." And the conversation was ended. The "microsteamship company," they say, should do everything and be able to do everything.

There are a large number of similar examples. But how many inquires, decisions and so on are required of the independent operational groups of ships? You will not count them. And all this is because there is no precise regulation of the duties and rights, the ties are not delineated, the limits of competence are not outlined, the flows of information are not limited. But if you consider that the independent operational groups of ships are made responsible for the work with the crews, navigation safety, the turnover of personnel and the like, the rest will become clear: the possibilities of engaging in the basic business--the organization of the voyage of each ship--are limited. Sailors cite many examples which confirm this. Here is one of them. Two ships lie in a foreign port at the berth after unloading. There is cargo on the berths. But both ships get under way in ballast. Three ships arrive after a day specially for the cargo. The ships departed in the same direction, but they belonged to different independent operational groups of ships. The efficiency of the use of the fleet suffers. And this, in turn, is a

prologue, on the one hand, to the "swelling" of the structures and, on the other, to regionalism, to unhealthy phenomena in cost accounting, which once in a while appear in some steamship companies.

Material factors attest to a considerable extent to the status of the specialists of the independent operational group of ships. For example, in the Latvian Steamship Company the specialist of the independent operational group of ships receives bonuses which, as a rule, are 5-10 percent less than of the same kind of specialist in another subdivision of this steamship company. The point is that the Statute on the Payment of Bonuses envisages a number of additional conditions in the form of specific indicators, which are liable to mandatory fulfillment by the specialists of independent operational groups of ships. Taking into account the importance of these indicators and the difficulty of their fulfillment, it would be proper to increase somewhat the initial percentage of the payment of bonuses to the group of specialists of the transportation service. Say, by 4-5 percent. In some steamship companies they are also acting in this way. For example, in the Lithuanian Steamship Company the workers of the independent operational groups of ships are entered in the Statute on the Payment of Bonuses in the first category with the highest coefficient of 1.5. This condition ensures the proportionality of the bonus payments and serves as a good criterion of the evaluation of the work of the leading specialists of the steamship company.

The status of the specialists of the independent operational group of ships, of course, should be high. However, attempts to increase it artificially are observed in some cases. As is known, relatively young specialists are employed in operational work, while the captain-instructors and mechanic-instructors are to a greater extent established people, "who have eaten poods of salt at sea." And now they have subordinated the latter to the former.

It will not do at all when the group traffic supervisor or the chief of the independent operational group of ships organizes his work with the instructors on the note of an order. This is a mistake. In the instructors the sense of responsibility is so developed, that such methods are inapplicable to them. Hence defects, which hinder the normal rhythm of work, appear in the interrelations. Perhaps, in part the explanation of the fact that almost nowhere have instructors settled down in the independent operational groups of ships, lies in this. And it is necessary to take this into account. In interrelations there are also their own criteria.

There should also be criteria of evaluation when using computer equipment. About 10 years ago many computer centers took the trouble to issue the daily position of ships. Whereas in the manual version the typist issued these positions in 2-3 hours, the automated version is hundreds of times more expensive. The main thing is no longer in the superposition, but in the quality. The computer centers frequently put out low quality products, errors in the names of the ships, ports and coordinates are frequently made. Here and there they have gotten used to this and, without checking the document, turn to the control room. In the Latvian Steamship Company they were forced to return to the services of the typist. And the matter went right.

Of course, the automated version of keeping a continuous chart, having taken the place of the manual version, played a positive role in the organization of the operation of the fleet. And, probably, with time computers will assume a portion of the functions of the independent operational groups of ships.

When the question is asked: How are the independent operational groups of ships set up and how are the ships distributed among the traffic supervisors in the independent operational groups of ships? some specialists reply: this depends on the series of ships, the directions of the work and the amount of work. All this is correct. However, the amount of work and the workload of specialists of the independent operational groups of ships in many steamship companies are still determined "approximately." The ship-call could be the criterion of the workload of the individual specialist. Not everyone agrees with this, but there are no other suggestions.

Maritime transport is faced with the problem of increasing the efficiency and quality of the operation of the fleet. Without having answered the question "Where are the independent operational groups of ships headed?" you will not solve this problem.

From the editorial office: the articles of P. Fedoseyev and G. Grin'ko, in which the shortcomings of the operation of the independent operational groups of ships of the Black Sea Steamship Company were noted, were published in MORSKOY FLOT, Nos 7 and 11, 1983. The article of V. Ponomarev continues the examination of the problem of the further development and improvement of the management of the fleet. Although several assertions of the author are debatable, the editorial office believes that the article "Where Are the Independent Operational Groups of Ships Headed?" poses important questions, which require extensive discussion among navigation personnel and the workers of the staff of steamship companies.

We await your letters and articles, comrades.

7807
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LENINGRAD MARITIME TRAINING/RESEARCH CENTER PROFILED

Moscow MORSKOY FLOT in Russian No 3, Mar 84 pp 26-29

[Article by Yu. Zurabov, chief of a department of the Morsvyaz'sputnik All-Union Association; Yu. Panin, director of the Central Scientific Research Institute of the Maritime Fleet; and A. Yakushenkov, chief of a department: "The Maritime Training/Research Center"]

[Text] The introduction of simulator instruction for the practical training of navigators of the maritime fleet began in the late 1960's. It was due to the following two circumstances. As is known, the subjective factor, that is, errors connected with the inadequate practical skills of navigators, is one of the basic causes of nautical accidents. The acquisition of such skills on ships is a lengthy, expensive and not always successful matter, since during the period of navigation it is impossible for educational purposes to create extreme situations, in case of which accidents usually occur. Trainers make it possible to artificially simulate any conditions of navigation and to conduct practical exercises of navigators.

The appearance on ships of complex electronic means of navigation, for example, radar stations, which required for their efficient use the preliminary simulator training of navigators on shore under the supervision of experienced instructors, was the second circumstance.

Radar simulators, which have become widespread in the world and ensure the great efficiency of training, were the first navigational simulators. Such simulators are being used successfully in our fleet. More than 22,000 navigators have undergone training in them.

At present the further development of the simulator instruction of navigators has been required in connection with the appearance in the fleet of superships and specialized ships with limited maneuvering capabilities, which are fitted with even more complex navigating equipment, such as automatic radar plotting equipment. The International Conference on the Training and Certification of Seamen and Watch Keeping of 1978 adopted three special resolutions, which were devoted to the simulator training of navigators in the use of radar stations and automatic radar plotting equipment and the handling of superships.

For the fulfillment of these resolutions and the further increase of the level of the simulator training of navigators a maritime training/research center

was put into operation in Leningrad in 1983. It is equipped with a set of electronic simulator devices, which were developed with allowance made for the latest achievements in the area of electronics and systems engineering. Much scientific research and design work of specialists of the Central Scientific Research Institute of the Maritime Fleet, the Baltic Steamship Company and the Morsvyaz'sputnik All-Union Association on the technical and economic substantiation of the equipment of the center and the choice of simulator and other equipment preceded the establishment of the center.

Owing to the possibility of the modeling in an electronic simulator of the process of controlling a ship under any conditions of navigation it is a valuable base for the conducting of scientific research on a wide range of questions of navigation safety and the organization of shipping. This is attested by the experience of foreign training/research centers, for example, in Holland, the United States and England, where for a number of years now various studies on the problems of navigation have been conducted on the basis of electronic modeling.

Technically the Leningrad Center consists of a set of interconnected data processing and display systems, which model the behavior of a deep-sea transport ship under real operating conditions. The complex includes five functional simulators: for the maneuvering and control of the ship, a navigational simulator, a radar simulator, for automatic radar plotting equipment and for the planning of cargo operations with the control of the seaworthy and strength characteristics of the ship in the process of its loading.

Four full-scale physical models of the conning bridges of modern deep-sea ships have been built at the training center for the maximum approximation of real perception. Two bridges are completely fitted with moden navigation equipment and means of the control and monitoring of the movement of the ship. The other two have simplified equipment.

The control of the simulator is carried out from the instructor's post, which is equipped with two consoles with the necessary recording and control equipment. The situations, which are fed from the console of the captain-instructor and are developed in conformity with the actions of the students, are displayed on a color television screen in the classroom. This makes it possible to collectively examine the situations and to analyze the actions of the students on the bridges.

A computer system, which includes 4 minicomputers with a capacity of 128K words and several control microprocessor devices, is the basis of the entire training center. Standard mathematical models of deep-sea transport ships and operating areas are included in the software of the computer system. Special equipment serves for the creation of a bank of any other operating areas which have been selected for modeling.

The simulator for the maneuvering and control of the ship is based on the simulation of the environment of the ship under night navigating conditions. The environment is observed through the windows of the conning bridges on a screen with a horizontal viewing angle of 150° and a vertical viewing angle of 40°. The lights of oncoming ships, navigation markers and various shore structures (bridges, berths and so forth), as well as the horizon line and the forward end of one's own ship are displayed on the screen.

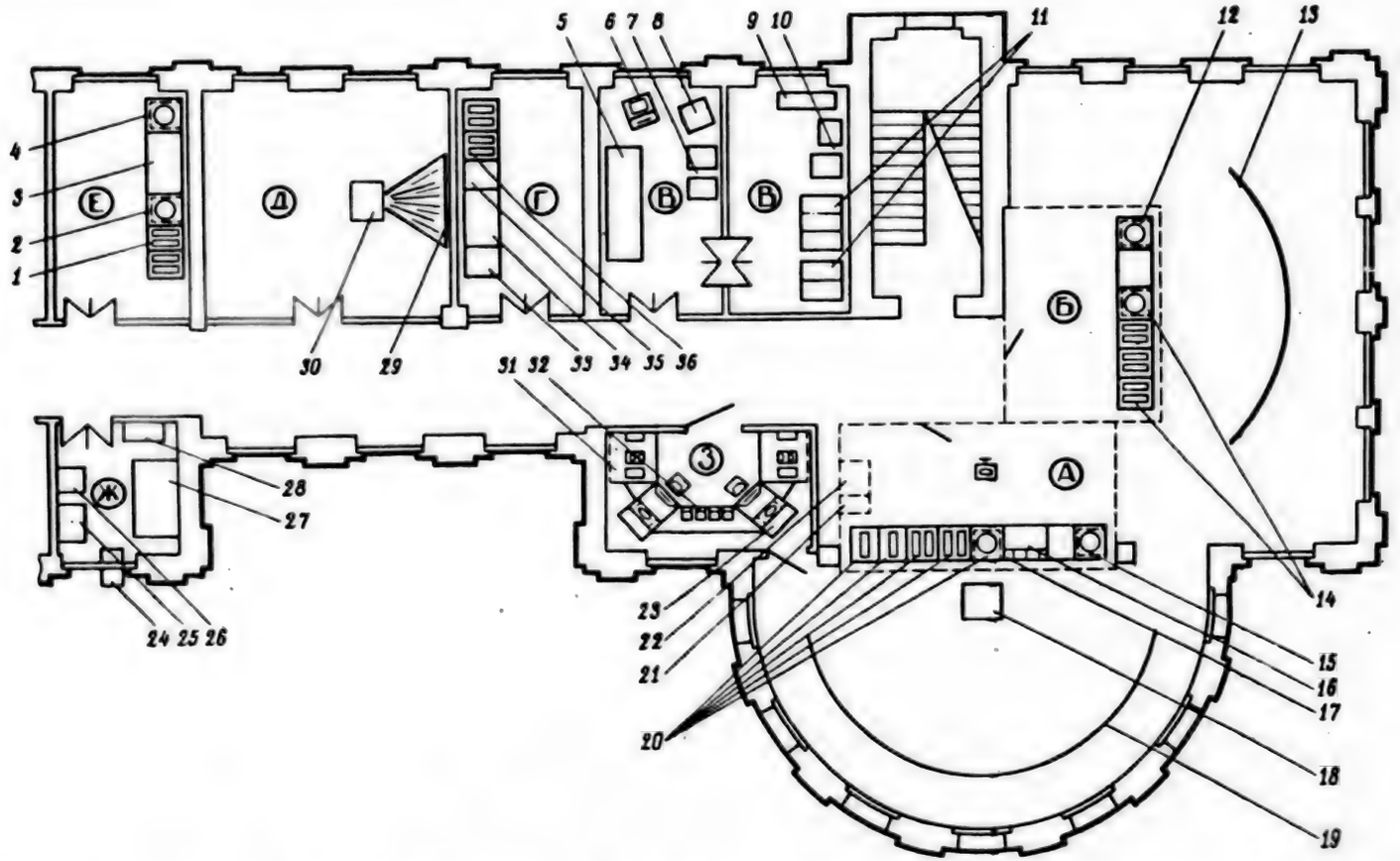

Diagram of the Arrangement of the Equipment of the Maritime Training/Research Center. А--pilot house 1; Б--pilot house 2; В--computer center; Г--pilot house 3; Д--classroom; Е--pilot house 4; Ж--electric power room; З--instructor's room. 1--navigation and control console; 2--Briz-Ye automatic radar plotting system; 3--navigator's desk; 4--radar display; 5--microprocessor systems; 6--plotter's terminal; 7--computer teleprinters; 8--digital plotter; 9--air conditioner; 10--Nord-100 computer; 11--central processors; 12--radar display; 13--screen; 14--ship navigation and control system; 15--radar display; 16--navigator's desk; 17--receiver-display of radio navigation system; 18--projection system; 19--screen; 20--ship navigation and control system; 21--receiver-display; 22--radio direction finder; 23--instructor's console; 24--air conditioners; 25--rotary converter; 26--converter of power supply of the Briz-Ye automatic radar plotting system; 27--stabilizers; 28--distribution board; 29--screen; 30--television projection unit; 31--recording devices; 32--visualization control consoles; 33--radar display; 34--navigator's desk; 35--DB-7 automatic radar plotting system; 36--navigation and control console.

The display of the lights is carried out by means of a optical-mechanical system, which is controlled by the computer complex. Two xenon bulbs, which are connected by fiber light guides with the set of projection components and are equipped with biaxial servosystems, are the source of light. The resolving power of the projection component is 1.5 minutes of arc.

The characteristics and the position of the lights observed on the screen change in conformity with the movement of one's own and other ships. Various conditions of visibility, including dense fog, haze and so forth, are provided for in the simulator. At present it is possible to observe 24 lights simultaneously. However, the system stores in the memory and reproduces as the ship moves up to 200 stationary lights and up to 44 lights of oncoming ships. This makes it possible to model practically any danger areas of the world ocean.

The system of night visualization is synchronized with the radar simulator. This means that the situation observed on the screen conforms completely to the radar pattern on the plan-position radar display or on the display of the situation of the automatic radar plotting system.

The movement of one's own ship is simulated by means of a complicated mathematical model, which takes into account the basic dynamic characteristics of modern ships, the actions of the thrusters, the effect of shallow water, as well as external actions, such as the current and wind of a different force and direction. The control of the rudder and engine of one's own ship is carried out from the bridge in exactly the same way as on a real ship.

The manual and automatic (by means of automatic steering) keeping on course and the turn of the ship with the control of the angular speed of the turn are envisaged. All the data, which characterize the operating conditions of the engine and the parameters of the movement of the ship, are presented on the alphanumeric display. A VHF radiotelephone for communication with oncoming ships is installed on the bridge. The perception of the environment has been raised to such a degree that the student in practice does not sense that he is on a fixed base, and not on the bridge of a real ship.

One of the most interesting features of the training center consists in the design of the navigation simulator. It is a set of microprocessor devices, which generate real antenna signals of various radio navigation systems, as well as a radio direction finder and sonic depth finder.

The antenna inputs of the corresponding ship navigation instruments are connected to the outputs of these simulators. In the microprocessor simulators the signals of the radio navigation systems are generated according to programs, which take into account the movement of one's own ship, the time of day, the parameters of the systems and their errors, which are attributable to the conditions of radio wave propagation. Thus, the readings taken from the navigation instruments correspond with great reliability to the real movement of a ship in the given region of the world ocean. Here the navigation simulator is completely synchronized with the radar simulator and the simulator for the maneuvering and control of the ship. It is also possible to use it independently from them, for which the independent manual input of the initial data in

each microprocessor is envisaged. The two main conning bridges of the training/research center are equipped with navigation simulators.

The advantage of the simulator of the real signals of navigation systems over the simulators of navigation instruments themselves, with which all the simulators known so far are equipped, consists in the great flexibility, the possibility of connecting to the simulator any real navigation equipment, which creates the conditions for its objective evaluation and the conducting of ergonomic research.

The radar simulator includes all four conning bridges of one's own ships. On two bridges the basic radar displays represent a single whole with the displays of the automatic radar plotting system and, moreover, these bridges are equipped with standby radar. On the other two bridges the basic radar stations are separate from the displays of the automatic radar plotting system.

On the displays of the radar simulator it is possible to observe up to 43 modeled targets (oncoming ships), including 3 of one's own ships, and up to 400 stationary markers. The displays can operate in the modes of relative and proper motion and can be oriented with respect to the meridan or the course of one's own ship. The regulation of the intensity of the echo signal, the length of the pulse, the interference from rain and seas, the height of the antenna and the width of the radar directional pattern is envisaged. The bow and stern shadow effect is modeled. The coastline is created by means of a digital generator.

The digital generator of the coastline is a separate six-module processor. The resolving power of each model is varied by a program means and has four levels: 25, 50, 100 and 200 m. Depending on the resolving power of each module the length of the coastline being generated can reach 220 X 220 miles. The modules with the minimum resolving power are used in case of the need for the more detailed depiction of the coastline; if it is necessary to depict areas of dry land, the modules with a moderate and high resolving power are used.

Each bridge of the radar simulator is furnished with devices of the push-button control of the rudder, the engine and the engine telegraph. The information on the parameters of the engine of one's own ship is fed into the alphanumeric display.

The movement of oncoming ships is modeled by a program means in the form of segments of straight lines, which connect the turning points. In all up to 400 such points are at the disposal of the instructor. He can change the speed of the oncoming ship and the time of its maneuver at the turning points. Here they bear in mind that the speed of the target changes with constant acceleration, while the course changes with a constant angular speed.

Each bridge of the training center is equipped with automatic radar plotting equipment, including the modern Norwegian DV-7 system and the domestically produced Briz-Ye system. All the automatic radar plotting systems in their technical characteristics meet the requirements of the well-known Resolution

of the Assembly of the International Meteorological Organization and the Convention on the Protection of Human Life at Sea of 1974. The operation of the automatic radar plotting systems is completely synchronized with the main radar displays. In case of the breakdown of the means of the secondary processing of radar information the displays of the automatic radar plotting systems can be used as ordinary plan-position radar displays.

The possibility of playing different versions of the loading of the ship with the continuous monitoring of the stability and strength in the sections of the hull is envisaged in the computer system of the training center. A tanker with a dead weight of 38,000 tons, a Ro-Ro with a dead weight of 12,000 tons and a container carrier with a dead weight of 37,000 tons have been incorporated in the program.

In the future it is proposed to develop this simulator, having included in it models of ships of other classes, as well as to develop simulators of sensors (draft gauges, level gauges, strain gauges).

The possibility of using the simulator for the solution of emergency problems as applied to specific classes of ships will be created in the future.

Extensive possibilities for the monitoring of instruction are envisaged at the training center. Each console of the instructor is equipped with a plotter, which operates in a rectangular coordinate system, a six-channel analogue recorder and a teleprinter.

All the exercises for the training are fed into the system by means of floppy discs. The conditions of the problems can be changed by rerecording the discs.

In conformity with the decisions of the International Conference on the Training and Certification of Seamen and Watch Keeping of 1978 base courses of the improvement of the skills of navigators are being organized at the base of the maritime training/research center in accordance with the following programs: radar surveillance, the use of automatic radar plotting equipment, the maneuvering and control of ships.

The full combined cycle of classes in these programs comes to 3 weeks; instruction in individual programs is also possible. Navigators, who have experience in keeping independent underway watch, are admitted to the classes. The instruction is conducted by experienced captain-instructors of the Baltic Steamship Company, who have undergo special training.

The steamship company bears responsibility for the planning and organization of the instruction, the making up of the educational groups and the verification of the occupational level and acquired skills.

The technical support of the training equipment, the development and improvement of the software, the further development of the training center and the conducting on its basis of scientific research have been assigned to the Central Scientific Research Institute of the Maritime Fleet. The increase of the software first of all presumes the setting up of a library of the main classes of ships of the maritime fleet and the main dangerous operating areas. The

tasks of the analysis of nautical accidents, the development of systems of the regulation of shipping in the approaches and water areas of ports and the evaluation of the effectiveness of various measures on the assurance of navigation safety in specific regions can be posed on this basis at the training center. One of the interesting directions of the use of simulation equipment consists in the modeling of the pilotage of ships in case of the designing of new hydraulic engineering structures and the building of dams and bridges. It is well known that electronic simulation models were used successfully in Holland when building the approach lanes to Europort.

The establishment of the maritime training/research center is affording new opportunities for the increase of the level of the vocational training of sailors and of the quality and success of scientific research and is a further contribution to the assurance of navigation safety and the increase of the efficiency of maritime transportation.

7807
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NEW FINNISH-BUILT TANKER 'VENTSPILS' PROFILED

Moscow MORSKOY FLOT in Russian No 3, Mar 84 pp 41-43

[Article by Yu. Pronin, senior engineer of the Mortekhsudoremprom All-Union Association: "The Tanker 'Ventspils'"]

[Text] In late 1983 the fleet of the Latvian Steamship Company was supplemented by the new type product tanker "Ventspils," which was built by Finnish shipbuilders at the shipyard of the (Rauma-Repola) Joint Stock Company. The "Ventspils" is a traditional product tanker, which, however, has peculiarities which distinguish it from ships of this class. In addition to the transportation of petroleum products, the tanker is also designed for the transportation of methanol, while the chosen paintwork of the cargo tanks, the material of the piping and the fittings of the cargo system meet the requirements for the transportation of other chemical cargoes, such as butanol, isobutanol, metaxylene and orthoxylene.

The ocean-going ship is intended mainly for operation in the Arctic sea regions and the freezing ports of the Baltic Sea and the Far East at open air temperatures in the winter to -40°C (when performing work) and -50°C (when idle). In this connection the tanker was built for the ice category UL, with a double bottom in the area of the cargo tanks, and has in the cargo section two longitudinal bulkheads, with the exception of the No 1 port and starboard bow tanks. The forward end has been strengthened by 15 percent and additional reinforcing ribs have been installed in this area for navigation under the pilotage of an icebreaker "by the whiskers." A unit for the remote-control release of the towing cables ("whiskers") and a stern anchor are envisaged.

The possibility of taking on an additional amount of fuel makes it possible to increase the cruising range to 8,000 miles.

The ship was built for the class of the USSR Registry of Shipping and has the class symbol: with a draft of 6.7 m--KM✠UL I A1 (oil tanker); with a draft of 7.2 m--KM✠L2A1 (oil tanker). The hull lines were chosen from the conditions of the imparting to it of good seagoing qualities, moderate motion in clear water and increased navigability under ice conditions.

Taking into account the requirements on the protection of the environment from pollution in the Arctic seas, the tanker is equipped with an isolated ballast system with a total capacity of 2,223 m^3, which ensures in the ballast transfer

in case of 10 percent of the reserves a forward and stern draft of respectively about 3.5 and 5.6 m.

The Main Characteristics of the Ship:

Length:	
overall	113.0 m
between perpendiculars	104.5 m
Midship beam	18.3 m
Hull height	8.5 m
Draft:	
Arctic navigation	6.7 m
summer	7.2 m
Dead weight:	
with a draft of 6.7 m	5493 t
with a draft of 7.2 m	6296 t
Speed with a draft of 6.7 m	14 knots
Cruising range on reserves	5000 miles

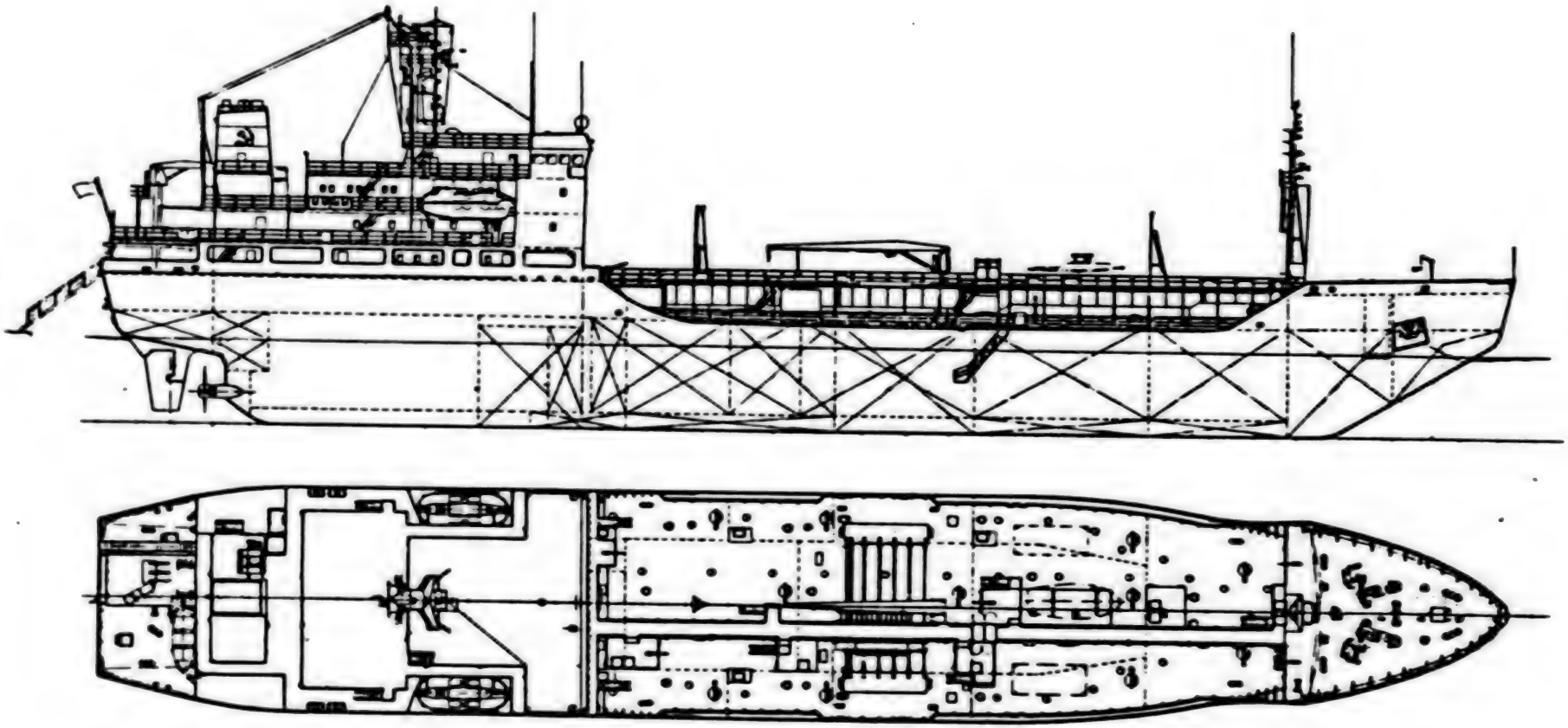
For the taking on of cargo the ship has 11 tanks, of which 3 are central and 8 are side, the total capacity in case of filling to 98 percent comes to 5,943 m^3.

A cargo system with submersible cargo pumps, which ensure the transportation of up to four types of cargo in separate groups of tanks, has been installed for the first time on Soviet ships on the tanker "Ventspils." For the possibility of loading one type of cargo through the filling line a branch pipe, which united all the groups of tanks, is installed on the manifold, while "figure eight" caps are installed on the forward unloading and loading cargo lines.

A cargo pump like the SDS 5-5A of the Frank Mohn firm has been installed in each cargo tank: 3 pumps with a capacity of 190 m^3/hr each and 8 pumps with a capacity of 145 m^3/hr each at a head of 85 m water column. The power plant, which serves these pumps, consists of 3 hydraulic pumps with a capacity of 0.5 m^3/min at a pressure of 165 bars with 161-kV electric motors. With the normal operation of two pumps of the hydraulic system the operation of three or four cargo pumps is ensured. The loading or unloading of four types of petroleum products can be carried out simultaneously.

The cargo system is automated. The control of cargo and ballast operations is carried out from the control station of cargo operations. Radar sensors with the processing of information by means of a microprocessor are used for measuring the level of the cargo in the tanks. The data on the levels of the cargo enter the system of the remote control of cargo and ballast operations, which is located at the control station of cargo operations and was developed by the Finnish (Kontram) firm. The system consists of a central processor and a color video display. The opportunity exists for the alternate calling to the display of four patterns, which reflect the cargo and ballast systems, the indication of the volume for each tank in cubic meters, the indications of the level and state of the ducts in the cargo and ballast tanks and the temperatures of the cargo.

The General Arrangement of the Ship



In case of the breakdown of the display there is dual redundancy: it is possible to determine the level of the cargo either by means of pointer instruments of (Kontram) or by means of digital instruments of SAAB SCANIA. The system automatically keeps track of the pressure in the cargo lines and the filling of the tanks. In emergency situations--in case of the break of the cargo hoses or an excess of pressure in the main cargo line--the appropriate valves close automatically and the cargo pumps stop.

The gas-venting system is automatic. For each group of tanks there has been erected a pipe to the height of about 7 m from the upper deck, which ensures effective gas venting in case of a specific rate of loading. The triggering of the discharge valve occurs in case of an increase of the pressure in the tank above the permissible pressure.

The design of the cargo system, which was used in the tanker "Ventspils," eliminated the need for the installation of a separate cargo pump room, while the existence of a flow system of the heating of the cargo in the central tanks and the No 1 port and starboard tanks eliminated the need for the installation in these tanks of heating piping. The flow system of the heating of the cargo is accomplished by the circulation of the cargo by pumps through deck heaters. Here the temperature of the cargo, which is taken on with a temperature of +55°C, can be maintained at the same level with an outside temperature of -40°C.

A system of the heating of the side cargo tanks of conventional design was adopted and ensures the heating of the cargo only for the transfer of light types of fuel.

A submersible pump with a capacity of 40 m^3/hr, which is intended for the washing of the cargo tanks, is installed in the slop tank. The mechanized washing system ensures the washing of the tanks with hot water in a closed cycle.

A pipeline and accessories for the discharge of oil-bearing waters are envisaged in the plan of the settling tanks. A Seres control instrument like the O.D.M.E.S633 (France) was installed for the first time on ships of the Ministry of the Maritime Fleet for the monitoring of the oil content of the wash water being dumped over board. In the washing system ultrasonic sensors of the division of water-oil mediums of the (Mobrey Sensal) firm like the 442S were installed in the slop tanks.

On the tanker there is a UNEX B10-40 plant for the biological treatment of sewage. The equipment and systems, which are envisaged on the ship, completely ensure the fulfillment of the requirements of the International Convention MARPOL-73 and take into account the requirements on the assurance of the prevention of the pollution of the sea with petroleum in conformity with the (Regulations for Navigable Waters) of the United States.

The pipes of the ship systems, which have been laid from the stern living superstructure in the direction of the forecastle, in the area of the open cargo deck are covered with a metal casing, which protects them from the effect of low temperatures and sea water.

The operation of all the ship systems, which are located on open decks, is ensured at an outside temperature of -40°C. The serviceability of the hydraulic deck cranes with a lifting capacity of 3 tons in the midsection of the ship and 0.9 ton at the stern at an outside temperature of -50°C is guaranteed.

The ship is equipped with everything necessary for the performance of anchoring, mooring and towing operations.

Two manually controlled mooring winches each like the SMV-80 with the greatest tractive force of 80 kN, which were manufactured by the (Rauma-Repola) Joint Stock Company, are installed on the forecastle and poop decks.

At the bow each winch is equipped with a windlass adapter, at the stern one of the winches has a windlass adapter, while the other has a stern line warping drum. The bow windlass adapters are equipped with cable counters with the installation of indicators in the area of the control room of the anchor gear and in the wheel house.

The remote control casting of the bow anchors from the wheel house after the preparation of the anchor gear by hand is also envisaged. The casting gear is equipped with an automatic braking system, which controls the winches and sees to it that the speed of the paying out of the anchor chain does not exceed 80 m/min. The indicators of the speed of the paying out of the bow anchor chains are installed in the wheel house. The ship is equipped with three Hall's anchors, one of which is a spare.

Four rubber pneumatic fenders, which are attached temporarily in the service area by the deck cargo crane, are envisaged for the mooring of the tanker to ships at sea.

An electrohydraulic steering engine like the Soviet-made R16 has been installed on the ship as the drive of the steering gear. It drives the semibalanced, semisuspended streamlined rudder with two pintles.

The safety equipment of the tanker meets the requirements of the International Convention SOLAS-74 and includes 2 motor lifeboats of the tanker type, which are made of fiber glass, 4 self-inflating life rafts of the Swedish Viking firm with a capacity of 10 people each, which are located in pairs on each side, as well as ring life buoys, life jackets and other necessary equipment.

A model 6L45GFCA two-stroke, reversible, low-speed diesel with increased constant pressure supercharging of the firm (MAN-Burmeister and Wein), which was made in Denmark, was installed in the ship as the main engine. Engines of this model, which have been produced at the Bryansk Machine Building Plant, should be installed on ships of this series, beginning with the second one. The nominal power of the engine comes to 4.35 MW at 175 rpm. The built-in electric-drive blowers ensure maneuverable conditions with a propeller shaft power of up to 460 kW.

A peculiarity of the systems of the machinery plant of the tanker is the use of the design of a sea chest and an ice box with an increased degree of the recirculation of the cooling outside water. The main engine can run on diesel,

as well as heavy fuel with a viscosity of 3,500 cp Redwood 1 at 100°F. The force of the main engine is transferred to the stainless steel propeller with detachable blades. The shaft line consists of an intermediate and a propeller shaft, a cone friction clutch, bearings in an oil lubricant and a stern tube of the (Cederwal) firm, the design of which takes into account the operation of the ship in shallow water.

The ship electric power plant consists of four SKL diesel generators, which are installed on antivibration mountings, with a rating of 250 kV·A at 1,000 rpm. The generators are of the splashproof type, are self-exciting and are equipped with standing warm-up. The diesels operate on light fuel at a pressure of 3 MPa. The voltage of the power current network is 380 V, 50 Hz.

A diesel generator with a rating of 125 kV·A at 1,500 rpm is used as an emergency electric power source.

There are three compressors with tanks for meeting the need for compressed air: one primary air-cooled electric compressor with a capacity of 10 m^3/hr and a working pressure of 2 MPa and two starting air electric compressors with a capacity of not less than 100 m^3/hr and a working pressure of 3 MPa with cooling by sea water. There is also an actuating air electric compressor with a capacity of 100 m^3/hr and a working pressure of 1 MPa. The starting and actuating air compressors start and stop automatically upon achievement of a specific pressure in the tanks.

On the ship there is an automatic, self-cleaning separator of heavy fuel with a capacity of 2 m^3/hr in case of a viscosity of the fuel being separated of 3,500 cp Redwood 1 at 100°F. The diesel fuel separator in design is similar to the separator of heavy fuel. The separator of lubricating oil has a capacity of about 1.3 m^3/hr. Each separator is equipped with a stationary, suction and delivery pump. A separator with a capacity of 2.5 m^3/hr is envisaged for the treatment of bilge waters.

The boiler plant consists of two auxiliary water-tube steam boilers like the UNEX-2200 with a vertical arrangement of the furnace unit. The type of furnace unit is the RR-200M of the (Oylon) firm (Finland). The steam rating of one boiler is 2,200 kg/hr at a pressure of 70 Pa. Boilers of this model have been installed for the first time on ships of the Ministry of the Maritime Fleet.

A water desalinizer with a capacity of 15 m^3/day, which operates on the heat of the cooling water system of the main engine or the steam system, and a furnace for the incineration of the waste products of the separation of fuel and oil, household garbage and galley scraps, which operates automatically after preparation and manual starting, have been installed in the engine room.

The refrigeration plant of the food lockers is served by two compressors which run on the refrigerant freon-22. The operation of the plant is automatic.

For the creation of comfortable conditions in the living and service spaces on the tanker there is an air conditioning system, which includes a filter, primary and secondary heating batteries, a fan and a cooling battery. Heating is accomplished by a thermal liquid. The humidification of the air is

accomplished by steam. The heating efficiency of the air conditioning system is designed for the maintenance of an inside temperature of +20°C with an outside temperature of -30°C. In addition to the air conditioning system in the living spaces there is hot-water heating. Operating together, these systems ensure the maintenance of an inside temperature of +20°C with an outside temperature of -50°C. The cooling unit of the air conditioning plant is installed in the engine room and runs on the refrigerant freon-22.

The living and service spaces are located in the stern superstructure and are designed with allowance made for the accommodation of a 27-man crew and 4 trainees. In all 14 cabins with bathrooms for the command personnel, including 2 cabin suites, 13 1-man cabins with washstands for the crew (additional collapsible upper berths are envisaged in 4 commanding officer's cabins) and 2 2-man cabins for trainees are envisaged.

In addition to the living spaces, additional premises, which are necessary for normal daily life and good relaxation, including a gymnasium, a library, a photography laboratory, a room for personal studies and a sauna, have been fitted out for the crew.

The equipment of the ship with modern means of radio communications and electronic navigation creates good conditions for its reliable and safe operation.

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INTERSECTOR NETWORK DEVELOPMENT

CEMA COOPERATION IN DIESEL ENGINE IMPROVEMENTS

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[Article by Vladilen Balakin and Boris Vernov, candidates of technical sciences, director and department head, respectively, of the Central Scientific Research Diesel Institute in Leningrad: "The Prospects for Diesel Engine Construction"]

[Text] Diesels are widely used in a variety of industries. In railroad transport these engines power diesel locomotives of every modification, several types of road machines and mechanisms, and refrigerator cars. Ninety percent of the ocean-going and fishing fleets are diesel-propelled, as is the entire river fleet, and 70 percent of all derricks are equipped with diesel drive. Only general-purpose diesels are installed in heavy-duty trucks (dump trucks of 25 to 180 and more tons capacity), construction and road-building machines. Diesel drive is also widely used in mobile and, in part, stationary power plants. The technical level of many of the most important branches of industry and transport is, therefore, determined by the state and the level of development of diesel-engine construction.

The rise in demand for diesels stemmed in large part from their improved techno-economic parameters. In addition to achieving a high degree of economy (diesles now have an efficiency of 40-45 percent), there was a substantial rise in the reliability, motor resource (operational longevity before capital repairs now stands at 30,000-100,000 hours) and service life of many types of diesels and the mechanisms that use them. The variety of usable diesel fuels has been expanded. Automated diesels are now quite widespread.

The Principles and Forms of Our Cooperation

Improvements in the technological level of diesels and the expansion of their export depend in large part on the results of scientific and technical cooperation between the member countries of CEMA in the field of diesel-engine construction.

To heighten the effectiveness of research and accelerate the resolution of high-priority problems the GDR, Poland, the Soviet Union and Czechoslovakia

in February 1980 signed an agreement for 1981-1985 on scientific and technical cooperation in the creation and perfection of four-stroke diesel engines. In 1983 the agreement was joined by Bulgaria, Hungary and Romania.

The participating countries prepared a program of work which included such important themes as increasing diesel power with the aid of high single and multistage supercharging, researching mixture formation and combustion, creating special diesel assemblies (automatic lubricating oil and heavy fuel filters), studying the diesel's operational parameters and reducing its harmful impact on the environment.

This program is being implemented by scientific research and experimental design organizations, as well as diesel-manufacturing plants of the participating countries.

Until 1982 the prevailing form of scientific and technical cooperation was to coordinate ongoing work, thereby fostering the establishment of contacts between the partner countries. Such interaction usually does not entail any specific obligations by the parties involved, but merely the provision of information on current research into subjects of mutual interest. The growing complexity of the tasks assigned called for better forms of cooperation. In 1983 it was agreeed to handle some of the assignments on the basis of contracts which stipulate the parties' mutual obligations and the deadlines for their implementation.

The program adopted earlier was broadened to include six more themes whose development is of special importance for the economies of CEMA member countries. These include: a concerted effort to make diesels and their host machines more economical in order to reduce fuel and oil consumption; raising the values of the main performance parameters; comprehensive analysis of the electronic fuel injection process to optimize fuel consumption in accordance with the diesel's workmode; developing automated remote control, signal and regulator systems for diesels to enhance the reliability and technical level of user machines; optimization of diesel try-out modes to cut down on testing time, as well as research into the operational characteristics of diesels based on the use of promising types of heavy fuels.

A special section of the program is devoted to the development of uniform technical standards and testing methods; the creation of mandatory type-size series for some diesel parts and assemblies to ensure their technological compatibility on the basis of broad unification and interchangeability, which is of particular importance in the matter of promoting specialization and cooperation of production; as well as the expansion of barter deals.

Development Prognosis

Attaching great importance to the long-range development of the industry, the cooperating parties compiled a scientific and technological prognosis for diesel construction up to the year 2000. In the course of that work its authors:

determined the main areas of scientific and technological development in diesel engine design;

evaluated the long-range competitiveness of diesel drive as compared with other types of power plants;

carried out a system analysis of the diesel's main technoeconomic parameters, assessed their interdependence and the dynamics of their evolution;

studied the materials, main units, assemblies and systems of diesels crucial to the attainment of the level of development forecast;

developed a promising diesel prototype;

studied the demand for diesels in terms of numbers;

identified the scientific-research problems that have to be resolved to achieve progress in diesel construction.

The prognosis was compiled on the basis of information received, its systematization and analysis. The mathematical description of the object of prognosis was based on the correlative and regressive analysis methods which allow to single out the fullest and most reliable date about the target.

Three main groups of prognostication methods were used: extrapolation, expert assessment and mathematical models.

Analysis of the prospects for diesel construction reveals that diesels will retain their dominant position because they are the most economical of all heat engines. This is especially important given the looming deficit in fuel resources. The current trend toward deterioration in fuel quality calls for the development of new methods of refining and preparing it that would ensure a highly efficient combustion process. It should also be stressed that because petroleum resources are limited and the prices on petroluem fuels have risen, ways are being sought to run engines on other types of energy carriers, particularly gaseous fuels (methanol, hydrogen), synthetic fuels from coal and shale, coal dust (coal-suspension fuel).

The prognosis has been approved by the participating countries and its practical conclusions will serve as the basis for long-range planning of scientific research and experimental design development.

The Effect of Standardization

A very important step in further improving the quality of diesels and boosting their exports and imports is standardization within the CEMA framework.

The legitimation in CEMA standards of very high demands on the product is aimed at improving the technological level of diesels. All normative technical documentation on diesels and their component units is drawn up to comply with internationally accepted standards, thereby reducing the labor intensifty of the process. For example, the member countries of CEMA have come up with CEMA standard 1582-79 for measuring and testing diesels

which incorporates world achievements in diesel construction. This norm reflects more rigorous requirements for diesel quality and efficiency. Putting it into operation will result in fuel and oil savings and a reduction in test costs.

To ensure the high quality of mutual deliveries, above all of specialized production, the contracting parties have drawn up a diesel standardization program for 1981-1985 whose implementation will promote:

improvement in the competitiveness of CEMA member countries' output on external markets and expansion of their foreign trade;

broadening of specialization and cooperation in the production of diesels, their assemblies and parts;

establishment of optimal parameters and technical requirements for diesels, their systems, units, assemblies and parts.

The implementation of the program will play a substantial role in raising the technical level of diesels produced in the fraternal countries and will enable the parties concerned to organize the planned specialization and subsequently cooperation in the production of diesel units, assemblies and parts.

The successfully developing scientific and technical cooperation in this field covers areas and themes incorporated in the national 5-year plans. These reflect the results of joint scientific research and the goals confronting the participating countries.

For example, collaboration between the USSR and the GDR covers the following areas:

creation of forced diesels with a long service life and high dependability. This entailed exchanging the results of each other's scientific research and the organization of cooperation in the production of ChN21/21 diesels which allowed the GDR to master the fa' rication of ChN21/21 diesels and export them to the Soviet Union;

unification of Soviet and GDR standards, among them 20 standards in terminology, units and mechanisms, norms and regulations, technical requirements on diesels and their systems, all of which yielded definite economic results.

A set of unified standareds for viscous-friction twirl-oscillation dampers was drawn up by the specialized "Elbe-Werke" plant in Rosslau which incorporated the requirements of Soviet diesel-building plants. This led to an increase in cooperated shipments of these machines between the Soviet Union and the GDR. The unified standards encompass the dampers' design, their basic parameters and connection dimensions, type-size series, technical specifications and testing methods, as well as the nomenclature of initial data necessary to place an order. After these standards were issued a number of Soviet diesel-building plants terminated their own small-series production of dampers and now get them as cooperated shipments from "Elbe-Werke".

The dampers imported from the GDR are installed in power plants, ships and diesel locomotives supplied by the USSR to the GDR.

Also unified were standards for the technical terminology and specifications of marine diesel automated remote control systems. This facilitated the drawing up of unified specifications for the systems and thereby enhanced navigation safety.

In addition, the unification of Soviet and GDR standards enabled a specialized Soviet plant to supply the GDR with PH-30 indirect action regulators.

On a Bilateral Basis

As previously, bilateral long-range plans for scientific and technical collaboration stipulate the exchange of research results, joint methodologies, recommendations and standards directed at improving the technoeconomic parameters of operational and newly-created diesels.

Collaboration between the Soviet Union and the GDR involves four problems:

processing the combustion chambers and supercharge systems of highly-forced diesels;

researching the durability of the main assemblies and parts using existing and jointly compiled new computer programs;

developing methods and means for automatic diagnosis and methods for accelerated testing of operational reliability.

Scientific and technical collaboration between the Soviet Union and Czechoslovakia conforms to a 5-year plan for 1981-1985 which envisions the carrying out of scientific research on the basis of a division of labor, the exchange of information on increasing the capacity of diesels and the creation of diagnostic systems for four-stroke diesel engines.

As a result of the exchange of information a methodology was developed to prognosticate durability so as to determine the diesels' motor resource in planning the development of diesel construction for the next 5-10 years. Also produced was a methodology for the forced testing of power-plant diesels' reliability which makes for a reduction in testing time.

Presently being prepared is a system for coding breakdowns and defects in diesel parts and assemblies that will allow to optimize processing methods and analysis of engine reliability.

Automation of the gathering and processing of information on diesel tests is being conducted jointly, as is research into the problem "Design and calculation of internal combustion piston engines" whose goal is to reduce dangerous oscillations.

Technoeconomic substantiation shows that the exchange of information by the collaborating parties on their joint venture will allow the Central Scientific Research Diesel Institute to reduce its own costs.

As a result of our collaboration with related research institutes in Czechoslovakia which are highly experienced in the automation of diesel stands, the current 5-year plan envisions the creation of a prototype specimen of a microcomputerized automated system for gathering and processing measurement data. The technology and the mathematical input involved will be on a par with the highest world standards which, following its incorporation into production, will allow to cut back on purchases of this type of equipment in capitalist countries.

Joint research and development conducted in the framework of bilateral and multilateral scientific and technical collaboration in diesel construction will undoubtedly lead to new successes in raising the technical level of marine, locomotive and industrial diesels.

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